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# CONTENTS.

## SECTIONS

Amoebiasis and Dysentery ... ... 1-31, 351-81, 775-804
Beriberi ... ... ... ... ... ... ... 125-8, 597-608
Blackwater Fever ... ... ... ... ... ... ... 650-69
Book Reviews 74-6, 160, 248-50, 324-8, 411-18, 497-506, 596, 681-4, 771-4, 857-9, 941-5, 1022-25
Cholera ... ... ... ... ... ... ... 41-7, 460-71, 923-8
Climatic Bubo ... ... ... ... ... ... ... ... 316-17
Dengue, Pappataci, and Unclassed Fevers ... ... 119-20, 626-8
Dysentery, Bacillary, Ciliate, Flagellate, Mixed and Unclassed 22-31, 366-81, 791-804
Enteric Fevers ... ... ... ... ... ... ... 48-51
Granuloma Venereum ... ... ... ... ... ... 313-16
Helminthiasis ... ... ... 161-204, 249-50, 507-44, 975-1010
Historical ... ... ... ... ... ... ... ... 329-50
Infectious Jaundice ... ... ... ... ... 95-100, 704-15
Japanese River Fever ... ... ... ... ... ... 624-5
Kala Azar ... ... ... ... ... ... ... 130-49, 629-49
Laboratory Reports ... ... ... ... ... ... 812-21
Leprosy ... ... ... ... ... 205-21, 545-59, 904-22
Malaria ... ... ... ... ... ... ... 251-85, 723-59
Medical Zoology ... ... ... ... 385-410, 419-40, 861-903
Miscellaneous ... 52-73, 150-60, 232-47, 487-96, 670-80, 822-56
Oroya Fever and Verruga Peruana ... ... ... 120-2, 622-4
Pellagra ... ... ... ... ... ... ... 286-95, 805-11
Plague ... ... ... ... ... 32-40, 453-9, 929-40
Rabies ... ... ... ... ... 222-31, 483-6, 760-70
Rat-Bite Fever ... ... ... ... ... ... 92-5, 702-3
Relapsing Fever and Other Spirochaetoses ... ... 77-91, 685-701
Scurvy ... ... ... ... ... ... ... ... ... 129
Sleeping Sickness ... ... ... ... ... ... 560-95, 945-74
Sprue ... ... ... ... ... ... ... ... ... 382-4
Tropical Dermatology ... ... ... ... ... ... 441-52
Tropical and Endemic Typhus ... ... ... 122-4, 625-6
Tropical Mycology ... ... ... ... ... ... 318-23
Tropical Ophthalmology ... ... ... 472-82, 1011-21
Undulant and Abortus Fevers ... ... ... ... 108-18, 609-21
Yaws and Syphilis ... ... ... ... ... ... 296-313
Yellow Fever ... ... ... ... ... ... 101-7, 716-22

Index of Authors ... ... ... ... ... ... ... ... 1027
Index of Subjects ... ... ... ... ... ... ... 1050

## ILLUSTRATIONS.

Annam Swelling: Three Phases ... ... ... ... 63
Chart Showing Agglutination in Human Tularaemia ... 116
Keratoid Exanthem of Trunk and Extremities in a Yaws Patient ... ... ... ... ... ... ... 301

(K3419) Wt P1865/255 1,500 3/28 H & Sp Gp 52

## ILUSTRATIONS—*continued.*

Leyden Institute of Tropical Medicine ... ... ... 835
Carmichael Hospital for Tropical Diseases, Calcutta ... 836
School of Tropical Medicine, Calcutta ... ... ... 836
Map: West Africa, showing Foci of Yellow Fever ... ... 1024

## CORRESPONDENCE.

Medical Zoology ... ... ... ... ... ... ... 859–60

## ERRATA.

Vol. 24, No. 1, p. 25. Translation of title of SAROJITO's paper should read "Variation of Toxin Formation by Shiga-Kruse Bacilli with *varying* Hydrogen-ion Concentrations."

Vol. 24, No. 2, p. 108. Summary of iii. BRENN and AMIO-ZADE's paper: Micrococcus infection was indicated in 4·8 per cent. of 82 cows examined at the Baku slaughter-house, not in "48· per cent." as printed.

Vol. 24, No. 11, p. 933, line 14. For *Ctenopsylla cuniculi* read *Ctenopsylla musculi.*

BUREAU OF HYGIENE AN[redacted]SEASES.

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 1.

## AMOEBIASIS AND DYSENTERY.

### AMOEBIASIS.

JAMES (W. M.). **A Survey for Amoebiasis at Santa Marta, Colombia. (Preliminary Report.)**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 160–165.

The author lays stress on the necessity in all doubtful cases of examining a permanently mounted wet-fixed and stained preparation ; in such a preparation identification of *E. histolytica* is certain, whereas it is often doubtful in fresh and iodine preparations. Permanent preparations will also invariably show a higher incidence of all kinds of entamoebae than will fresh or iodine preparations. From one case four fresh stools were absolutely negative even in the fixed and stained preparations ; yet the fifth stool showed numerous *E. histolytica*. In suspected cases, therefore, re-examination of stools is obligatory. The examination of stool specimens for *E. histolytica* cannot be considered as a light routine laboratory procedure, if correct diagnosis is desired. The author is sure that in the old days at Ancon Hospital an enormous number of amoebic infections were overlooked. There must be a thoroughly trained personnel to conduct stool examinations.

*Results of survey.*—Over 50 per cent. of hospital patients proved to be infected with *E. histolytica*, and the hospital personnel revealed almost as high an incidence. The Fruit Company staff (other than hospital) gave an incidence of about 10 per cent. less than the above two groups. The club servants, waiters, cooks, revealed the astonishing incidence of over 60 per cent. The outpatient group, all with histories of past infection, were more than 60 per cent. infected. Amoebic is far more widespread than any other form of protozoal infection in the Tropics. Even if a *winter season* should come to the Tropics the incidence of amoebic infection would remain unchanged so long as the population remained filthy in their habits. The damage done by a long-continued chronic amoebic infection is worse than that inflicted by chronic malaria ; chronic amoebic infection is nearly always associated with intestinal worms.

*Method of infection.*—The author is emphatic that this is always—"*a method of finger to mouth, directly or indirectly.*"

*Prevention.*—"*The best preventive measure is to insist that all servants clean their hands thoroughly with scrubbing brush, antiseptic soap, and water several times a day—especially before preparing or serving food !*"

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With Dr. KOFOID, the author has noted how entamoebae disappear from the stools of cases subjected to vigorous bismuth treatment. He believes bismuth to be the best remedy we have, but it should be given for at least six months. One must try to *eradicate the infection in the lumen of the bowel*: the tissues will have taken care of the entamoebae that have penetrated them. Dr. James declares himself still *unconvinced that amoebiasis is a genuine systemic infection.* Any lesion in a tissue that is to be considered of amoebic origin must show amoebae as entire parasites beyond any possibility of a doubt; the diagnosis cannot be established on the basis of a nuclear structure alone.

Dr. James does not accept all the species named by Dr. KOFOID, He agrees as to the morphology, but not the nomenclature, of *E. histolytica.* The entamoebae described by KOFOID as *Karyamoebina falcata* and *Councilmania lafleuri* are to James just forms of *E. coli.* In several cases where KOFOID reported *Dientamoeba fragilis,* James could find only *Endolimax nana* and *Iodamoeba bütschlii*; an opinion, he states, confirmed by Clifford DOBELL, who is quoted also as being now convinced that *E. histolytica* is *not* always a tissue parasite; it can occur in the large intestine without tissue penetration. A latent infection therefore does not necessarily mean ulceration of the bowel—though it may at any time establish an ulcerative process.

H. M. Hanschell.

KOFOID (Charles A.) & SWEZY (Olive); BOYERS (Luther M.). **A Report on an Investigation of Intestinal Protozoan Infections at Santa Marta, Colombia, in the Hospital of the United Fruit Company, with Special Reference to the Incidence of Amoebiasis.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 140–153. [1 ref.]

A total of 556 examinations was made on 367 persons, representing fully the native population and coastal immigrants from tropical America; these two groups consist of mixed racial stocks, Amerindian, African and Caucasian and the imported American personnel. The statistical results of these examinations are tabulated.

*E. dysenteriae* was found in 53·7 per cent.; in the staff of the United Fruit Company, 40 per cent. *Iodamoeba bütschlii* was found in 20·9 per cent. and 24 per cent. harboured *Councilmania lafleuri.* Five cases were infected with *Enteromonas hominis,* three with *Isospora hominis* and three with *Balantidium coli.* The distinct impression was conveyed by the cumulative effect of examinations that the authors were dealing with massive heavy infections in the general population. 52 per cent. had acquired 3 to 7 different parasitic infections—showing the tendency for persons exposed to faecal infections to accumulate the commoner infestations.

The epidemiology of amoebiasis is rather imperfectly known. The infected stool is the only vehicle for conveyance of contagion. To acquire amoebiasis, one must swallow something contaminated by infected faeces. WENYON and O'CONNOR showed that the housefly may retain cysts after feeding on infected faeces from five minutes to 42 hours. Fly destruction is therefore an important preventive measure, as is the careful cleansing of all foodstuffs, especially such as are eaten uncooked. The principal source of contagion, however, lies in the contacts which the infected person makes with food, utensils, wash bowls and other necessities and conveniences which the soiled hand may contaminate.

From the authors' nine years' 52,000 examinations of over 15,000 persons, including many family groups, they find conclusive evidence that the infection tends to spread in families, it may be over three generations.

There is as yet no conclusive evidence as to the relation of amoebic infections to water supply. That the infection may be water-borne is suggested by the higher incidence of hospital cases of amoebiasis during the wet season at Santa Marta. Whether cysts survive drying and may be carried in the dust is still an open question.

In the last analysis, however, it is the *cyst distributor* who is the source of the contagion. Meanwhile " the normal history of a chronic infection of amoebiasis is one of progressive deterioration."

H. M. H.

KOFOID (Charles A.). **Human Amoebiasis with Special Reference to the Chronic Phase.**—*Texas State Jl. Med.* 1925. Oct. Vol. 21. 12 pp. [1 ref.]

In this address to the State Medical Association of Texas the author states that historically amoebiasis in man has come to be stamped with the characteristics of tropical incidence and dysenteric symptoms. This, however, is but a partial picture of this parasitic infection. In temperate regions and in the practice of most U.S. physicians this disease is only incidentally met with in its dysenteric aspect, or traced to a tropical origin. Usually it is in the chronic phase in patients who have never had tropical exposure and have no recollection of a dysentery attack. Often stasis or chronic constipation, and only rarely a diarrhoeic condition of stool, characterizes the infection. Understanding of all types of nuclear structure and all the successive changes through which the nucleus goes during nuclear division is essential for accurate diagnosis. It is not possible to establish even a probable negative by a single examination of stool. A series of six *consecutive* stools should be examined. In examining sputum for amoebic abscess of lung it is essential to distinguish motile stages of *E. dysenteriae* from motile stage of *E. gingivalis* which abounds in many mouths, especially if pyorrhoea alveolaris be present. Amoebae may also be detected in motile and encysted stages in duodenal contents obtained by drainage. Seven or more species of amoebae live in the human bowel, of which five at least may present clear pseudopodia, and at least two, *E. dysenteriae* and *Councilmania lafleuri*, may be found with red blood cells in their cytoplasm. In detection of chronic human amoebiasis, in the laboratory, he has come to rely wholly upon identification of the encysted stage. Detection of motile stages of *E. dysenteriae* in tissues rests upon the nuclear structure and appreciation of the cytological differences between amoebae and human cells.

The tissue invasive capacity of *E. dysenteriae* is demonstrated by finding the parasite, in advance of the ulceration, in the submucosa of colon, lymph glands adjacent to ulcers, and especially in the capillaries and larger blood vessels of the peripheral serosa of the colon. The amoebae are found in the portal veins, from which they invade the liver. They are found in the pus of liver abscess and in liver areas beyond the wall of the abscess. Amoebae found by duodenal drainage denote liver infection in the absence of abscess. Their entrance into general systemic circulation is indicated by occurrence of amoebic abscess in lung and brain ; by their detection in epididymis, semen, bladder, or in the tubes. They have been reported in the skin of the perineum and in phagedenic ulcers around incision in cases of liver abscess. He has found the motile amoebae in the excised head of the femur in a case of arthritis deformans, and in the lymph glands in three cases of Hodgkin's disease.

He concludes from 46,000 examinations of 12,000 persons that these cases represent a group of persons in physicians' care with a predominance of the neurasthenic, rheumatic or intestinal type of mild invalidism, and an unusual number in whom diagnosis is obscure or complicated. In this group the incidence of infection by *E. dysenteriae* is from 10 to 20 per cent. In an examination of several groups of 60 to 100 persons not thus selected and presumably not diseased, the percentage of infected did not exceed 1 per cent. A tabulation of 7,000 persons examined indicated that those who have travelled extensively have double the rate of infection of those who have not travelled. This is indicative only of the increased risk of infection which all run who eat from many hands ; the tropics, too, are areas of lower standards of sanitation and higher incidence of infection. Amoebiasis is not limited to the tropics, but occurs widely in the human race. The nearest relatives of some of the amoebae of man are found in apes and monkeys—the human infections are the product of the evolutionary process—the parasites of man have descended from the parasites of man's ancestors. The relationships of amoebic infection, not only to dysentery, but to chronic intestinal trouble, to local abscesses, and to certain arthritic conditions, makes this infection an important one in medical practice. A thorough-going, accurate stool examination by a competent examiner trained in protozoology is highly desirable in any complete physical examination.

H. M. H.

MENK (Walther). **Amoebic Dysentery.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 166–169.

The author agrees with JAMES and KOFOID as to the prophylactic measures advised by them for the control of amoebic infection at Santa Marta ; if it were possible to carry them out, these measures would also reduce the incidence of enteric fevers.

He discusses generally the cases of dysentery admitted to hospital. All the patients are infected with hookworm. They cannot be kept long enough in hospital to undergo the prolonged classical treatment for amoebic dysentery, and only very few will continue any follow-up treatment outside. However, the few liver abscesses and deaths from amoebic dysentery indicate that clinical amoebic dysentery is efficiently controlled by the hospital and dispensaries medical service. A Wassermann test is indicated in all amoebic dysenteric cases that fail to respond promptly to emetine and bismuth. If the test be positive, combined antisyphilitic (preferably salvarsan) with antidysenteric treatment will generally effect a cure. Treatment for hookworm and other intestinal parasites, when such are present, should be given during a course of treatment for amoebic dysentery.

Bacillary dysentery with *E. histolytica* in the stools or acute bacillary infection engrafted on a chronic amoebic dysentery should always be considered, especially when the symptoms are very acute with frequent foul-smelling stools, fever, vomiting, abdominal pain, dehydration and toxaemia.

No lung infection due to *E. histolytica* was observed. A series of arthritis cases, of indefinite aetiology, was treated with emetine on the chance of the cause being amoebic metastasis, involving the joints, according to the ideas of KOFOID. No marked beneficial effect from the treatment could be observed. It appears that emetine-responding arthritis is a somewhat rare condition in Santa Marta.

H. M. H.

BOYERS (Luther M.). **A Report on an Investigation of Intestinal Protozoan Infections at Santa Marta, Colombia, in the Hospital of the United Fruit Company, with Special Reference to the Incidence of Amoebiasis.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 154–159. [1 ref.]

*Sigmoidoscopy.*—Most of the patients were found to have multiple infections of the bowel, in contrast with California cases where the infection is often single. The same kind of picture, however, is seen in both Colombia and California.

The picture varies according to the severity of the infection. From the erythema of mucosa in mild cases, to the severer grades of inflammation displaying dilated blood vessels with perivascular inflammation and infiltration causing the vessels to stand out boldly from surface of the mucosa; haemorrhagic areas of varying size; free blood and mucus in the lumen of the bowel; ulcerations of various size. The old chronic cases commonly showed irregular patches smoother and flatter than normal, representing apparently "scarified" areas. In a few cases, and only in those harbouring hookworm, punctate haemorrhagic areas were seen in the rectum. Pain was common in all cases—most severe in those with spastic bowel. Spasticity of rectum and sigmoid was as readily detected by sigmoidoscope as by X-ray. Haemorrhoids were common. Prolapse of rectum most often accompanied a spastic colon.

Treatment—can be divided into three periods—

(1) *Diagnostic period.*—Demonstration of presence or absence of pathogenic amoebae. Cathartics, e.g., rhubarb or magnesium sulphate, and cholagogues, e.g., *fel bovis* facilitate the search for amoebae, but in the presence of amoebiasis, since they increase hyperaemia of bowel and biliary mucosa, they are dangerous if vigorous treatment is not pressed immediately.

(2). *Eradication period.*—Attempted elimination of amoebae. The author recommends as agents to effect this all the drugs in present use, and for the case generally, digitalis, caffeine, diet, bed.

(3). *Post eradication period.*—Includes the use of a number of remedial agents, and occupational supervision, especially favouring out of doors employment.

The author has used yatren much in the past two years, and found it a useful adjunct to treatment—but has not yet obtained by it complete eradication of both motile and encysted *E. dysenteriae* in any case.

H. M. H.

CASTEX (Mariano R.). Ueber die Amöbiasis des Menschen. **[Amoebiasis in Man.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Aug. 1. Vol. 30. No. 8. pp. 309–333. [46 refs.]

This abstract can give only some of the points dealt with in this interesting lecture (delivered to the medical faculty at Hamburg), covering the whole ground of the clinical manifestations and treatment of amoebiasis and the biology of the parasites. The paper is the fruit of the author's observations and researches, in collaboration with Professor Daniel GREENWAY, over a series of years, in Buenos Ayres (and already reported by them in Argentine and French medical journals). They had been the first to discover and record the occurrence of *E. histolytica* in Argentina. There it is widespread—thus in 1924, out of 614 patients with intestinal complaints 24·5 per cent. were shown to harbour *E. histolytica*; and the parasite was found in 23·6 per cent. of 2,023 such patients in 1925. These findings they attribute to the careful systematic search for the parasites; to the fact that all the patients examined were ill—simple parasite carriers were therefore completely excluded; and that these patients were adults. GREENWAY had found in one province of Argentina 1·3 per cent. of quite healthy children infested.

H. M. H.

CASTEX (M. R.) & GREENWAY (D.). **[Amebiasis in Argentina.]**—*Prensa Méd. Argentina.* Buenos Aires. 1926. Feb. 20. Vol. 12. p. 905. [Summarized in *Jl. Amer. Med. Assoc.* 1926 July 3. Vol. 87. No. 1. pp. 68–69.

An analysis of the author's experience with 479 patients with amoebiasis —forming 23·6 per cent. of the 2,023 whose stools were examined. Infestation was pure in only 92.

Patients must be made to realize that it takes months—6 to 8 in some cases—for the ulcerations to heal; and that treatment must be continued to the final extinction of the infestation, changing drugs at need. Symptomatology is protean. Each course of emetine should be followed by suspension of treatment for two or three months; emetine polyneuritis is liable to develop when least expected. In one woman amoebiasis had induced intense pruritus for years; she was unable to tolerate emetine or bismuth, and drugs per rectum caused severe colon inflammation. The infestation still persisted in her after eight months of treatment.

H. M. H.

SITSEN (A. E.). Over complicaties van de amoebiasis van den darm. **[Complications of Intestinal Amoebiasis.]**—*Geneesk. Tijdschr. v. Nederl. Indië.* 1926. Vol. 66. No. 3. pp. 343–357. [22 refs.]

Sitsen found 221 cases of intestinal amoebiasis in a series of 2,700 autopsies after death from natural causes. In 69 amoebiasis was the only apparent cause of death; in 99 other causes were present in addition to the amoebic infection; a perforation peritonitis was found in 19 cases, peritonitis without perforation in 10, abscess of the liver in 22, of the kidneys in 2 cases.

He comments especially upon the metastatic complications. It is generally accepted that the amoebae are carried by the blood; no general agreement exists, however, whether amoebic metastases beyond the liver may be caused by passage of the amoebae through the capillaries of the liver or only by perforation of a pre-existent abscess of the liver into the hepatic venae. In many cases of pulmonary, cerebral or splenic abscess the embolic character has been shown, and the rarity of cerebral and splenic abscess is in accordance with the difficulties an embolus meets in passing the pulmonary circulation. As far as concerns amoebic bronchitis, the prevalence of which has lately been emphasized (PETZETAKIS, E. A.), Sitsen is in doubt whether the amoebae in such cases do actually belong to the histolytica type. Exogenous infection of the respiratory tract as well as of the urinary passages is possible.

Accepting that metastatic spread of amoebiasis is of embolic origin, and primarily caused by abscess of the liver, the causation of the latter is discussed. Sitsen thinks that the prevalence of the solitary abscess (in 60–75 per cent. of the cases) is in discordance with the theory of its haematogenous origin. He describes the way by which an infection may reach the liver from the caecum in a comparatively short way along the superior mesenteric glands, the subpyloric chain (against the lymph current) to the hepatic chain and the liver.

W. J. Bais.

BRUMPT (E.). Individualité de l'*Entamoeba dispar*. Présentation de pièces. [**Individuality of** *E. dispar.*]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 399–402.

WALKER and SELLARDS claim that of 20 healthy persons subjected to infestation by amoebic dysentery, four developed acute dysentery, and 14 became healthy carriers. The author's study of statistics in India, where all are exposed to natural infestation and where dysentery is widespread, show that there are 2 to 4 per cent. of dysentery cases. He reaches an identical conclusion for the French Far-Eastern colonies. Since 1914, most authors under the impression that man harbours only one amoeba producing four-nucleated cysts, and that this is the dysentery amoeba, have published statistics founded on a false basis. It is astounding that the amoebae of dysentery should cause dysentery in 20 per cent. in the Philippines, 2 to 4 per cent. in India and Indo-China, and once only in three or four million carriers in England. Liver abscess (an ailment not often unrecognized as happens in amoebic enteritis) shows a similar discordant geographical incidence. These puzzling observations would not have been published if the authors had studied the small amoeba with four-nucleated cysts described very briefly by PROWAZECK in 1912, as *E. hartmanni* ; or if KUENEN and SWELLENGREBEL, and later BRUG, who had observed the same amoeba in the Dutch Indies, had been able to compare experimentally its pathogenic rôle with that of the amoeba of dysentery, or there had been confirmation of the experiments of Sohei SHIMURA, who in 1918 showed the existence in Formosa of human amoebae with four-nucleated cysts, morphologically identical with those of *E. dysenteriae*, which produced feeble and ephemeral infection in the cat.

The author's failure to infect kittens with *minuta* type amoeba from healthy carriers led him to believe that SHIMURA had been dealing with this type, which appeared to be non-pathogenic for the cat. This failure was due, however, to faulty technique, for using the discovery of SELLARDS and THEILER that cysts " hatched out " in the cat's rectum, and the technique of BOECK and DRBOHLAV (occlusion of cat's anus and production of intestinal stasis), he had obtained later a high percentage of successful infections. His experiments in 1925–26 showed that, besides *E. dysenteriae*, there exist two other amoebae, parasitic in man, forming four-nucleated cysts, viz., *E. hartmanni*, which appears not to be inoculable into the cat, and *E. dispar*, inoculable into the cat. *E. hartmanni* forms cysts of less than 10µ—easy to distinguish from those of *E. dysenteriae*. *E. dispar* forms cysts 10 to 16µ, indistinguishable from those of *E. dysenteriae*. These two amoebae can be differentiated only by the fact that *E. dysenteriae* inoculated into kittens (400 to 600 grammes) produces the typical lesions of dysentery and kills them. *E. dispar*, on the contrary, though sometimes producing in the kitten a heavy infection, causes none of the lesions of dysentery. The author has studied experimentally *E. dispar* in two carriers who had travelled in various tropical lands, and in two persons who had never left France. POUBLAN has studied experimentally a fifth case in a youth of 15 years, with no intestinal trouble, who had never left France. The author is sure that C. A. HOARE (1925) obtained this same parasite in England (see below). A kitten inoculated with cysts and killed 41 days later was found to have normal intestines, no visible ulcerations, yet amoebae were demonstrated and reported as *E. dysenteriae*. If the existence of *E. dispar* be accepted, it becomes easy to interpret the surprising epidemological facts cited above.

H. M. H.

VIALARD & DARLEGUY. Sur quelques cas de pleurésie diaphragmatique droite primitive avec syndrome hépatique chez des malades coloniaux dysentériques amibiens. [**Primary Right Diaphragmatic Pleurisy in Amoebic Dysenterics from the Tropics.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. July 22. 3rd Ser. Year 42. Vol. 50. No. 26. pp. 1310–1318. [1 ref.]

In patients from the tropics, former sufferers from dysentery and hepatitis, who present symptoms referable to a lesion of the diaphragm, it is necessary to consider the possibility of primary pleurisy of the right base. The effect of emetine treatment will often help in the diagnosis. The differential diagnosis between suppurative hepatitis and pleural lesion of the right base may be made easier by a study of the leucocyte count. The authors' patients (primary pleurisy) all showed a mononuclear leucocytosis, as is usual in tuberculosis.

H. M. H.

FRANCHINI (Giuseppe). Sovra un caso di amebiasi generalizzata. [**A Case of Generalized Amoebiasis.**]—*Riforma Med.* 1926. Sept. 6. Vol. 42. No. 36. pp. 843–844. With 2 text figs. [5 refs.]

The author relates the case of a young woman who, three years ago, suffered from intestinal disturbance, and in whose faeces were found *E. histolytica*, both vegetative and cystic forms, and *Chilomastix mesnili*. For nearly a year the urine had been turbid, and a catheter specimen contained red corpuscles and vegetative forms of the same Entamoeba. Cure of both these conditions resulted from intramuscular injections of emetine. Three months ago she presented herself complaining of a troublesome cough, with mucopurulent expectoration, streaks of blood, and the physical signs of bronchitis. Examination of the sputum revealed vegetative forms of the Entamoeba and sparse cysts were present in the faeces. Injections of emetine were given as before, together with stovarsol by mouth. Improvement was rapid, and in a month the patient seemed to be quite cured. The author refers to a similar case described by Mme. PANAYOTATOU (this *Bulletin*, Vol. 23, pp. 655).

H. Harold Scott.

DE VECCHI (Bindo). Amebiasi cronica.—Mesosigmoidite—Peritonite. [**Case of Chronic Amoebiasis.**]—*Pathologica*. 1926. July 15. Vol. 18. No. 417. pp. 333–335.

This is a detailed record of an interesting case of amoebiasis, calling further attention to the fact of the existence of this disease endemically in Italy.

Thirteen days before his death, a man of 65 suffered from general pains, cough, fever and dyspnoea. Abdominal symptoms, immobility and meteorism, supervened ten days later. Autopsy showed a diffuse purulent peritonitis, the splenic flexure of the colon bound down by adhesions, and in the mucosa the conditions associated with chronic amoebic infection.

H. Harold Scott.

FLANDIN (Ch.) & DUCHON (Louis). Récidive de dysenterie amibienne après trente-trois ans de guérison apparente. [**Relapse of Amoebic Dysentery 33 Years after Apparent Recovery.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1926. Aug. 5. Year 42. 3rd Ser. Vol. 50. No. 28. pp. 1416–1417.

A man, age 63 years, following fatigue and exposure to cold, developed frequent muco-sanguineous stools teeming with amoebae, together with fever, tenesmus and abdominal pain. Emetine hydrochloride 12 centigrammes a day for six days, then tréparsol 0·50 gramme a day for six days, rapidly and completely restored the patient to health and caused both amoebae and cysts to vanish from stools. A critical and close enquiry into habits, environment, friends and relatives of the patient failed to find any possible source of infection. Thirty-three years before the patient had lived in Morocco and had there suffered from dysentery, which he well remembered. The author considers that tréparsol is superior to novarsenobenzol or stovarsol in its action on amoebic cysts.

H. M. H.

SIMPSON (Alan S.). **A Case of Amoebic Dysentery with Liver Abscess contracted in England.**—*Lancet*. 1926. Sept. 4. p. 495.

The man, aged 53 years, had never been out of England. Four weeks of frequent defaecation with blood and mucus in stool, fever, 8,500 leucocytes, differential count normal. Wassermann negative, urine normal, ill defined tender tumour in right lumbar region. Stools showed vegetative and precystic forms of *E. histolytica* in large numbers. Laparotomy revealed tumour to be abscess in right hepatic lobe containing yellowish pus, sterile on culture, and showing no amoebae by microscope. Following operation, good recovery on E.B.I. gr. iii daily for 12 days.

H. M. H.

SHANKS (G.). **A Case of Amoebic Abscess of the Lung.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. p. 393.

The case was encountered in a series of 30 autopsies on prisoners of war who died in No. 1 British General Hospital, Mesopotamia, June, 1918.

The patient was a Turkish corporal who, on admission to hospital, was emaciated and was found to be suffering from relapsing fever and amoebic dysentery. At necropsy—in *left lower lobe of lung* was an abscess 1·5 cm. diameter, near pleural surface and containing chocolate-coloured thick pus.

*Liver, spleen, kidney.*—Nothing of note.

*Intestine.*—Marked congestion and superficial erosion for 20 cm. above the ileo-caecal valve.

*Colon.*—Slightly thickened and much ulcerated, particularly at caecum, and at hepatic and splenic flexures, and in the terminal 30 inches.

Microscopical examination of contents of pulmonary abscess and large intestine revealed numerous typical living *Entamoeba histolytica.* Culture of mucus from surface of colon gave an agglutinating Flexner type of dysentery bacillus.

H. M. H.

HALL (G. A. M.). **A Case of Amoebiasis of the Lung.**—*China Med. Jl.* 1926. July. Vol. 40. No. 7. pp. 644–646. [7 refs.]

The author disclaims any considerable scientific value for his report of this case. His object is to draw attention, in China, to the existence of such cases—that they may the more readily be diagnosed, and an easily curable condition saved weeks of unnecessary invalidism.

A Chinaman, of 42 years, with fever, cough, anchovy sputum, no hepatic tenderness, dysentery denied. Physical signs denoted lesion of lung below angle of right scapula. 20 cc. of thin greenish albuminoid fluid aspirated from this area ; content predominantly polymorphonuclear ; no amoeba found, but material was not examined fresh. Repeated examination of sputa revealed no tubercle bacilli ; no fresh sputum smears were examined for amoebae. Stools well formed—no blood or mucus and no amoebae or cysts found on repeated examinations. Sigmoidoscope showed smooth and perfectly healthy mucosa. On 23rd day ½ gr. emetine hydrochloride was given intramuscularly and repeated every morning. Rapid improvement followed. After 12 doses, patient felt perfectly well and all symptoms and physical signs had disappeared.

After a brief survey of some of the recorded evidence in favour of primary amoebic abscess of lung, the author notes that in a large number of these cases, as in the one he reports here, diagnosis was made only when the condition was found to clear up rapidly under emetine, which LOISELET describes as " the diagnostic and therapeutic ' touchstone '." [The use of emetine in pulmonary inflammations with blood-stained sputa has been followed by disappearance of symptoms and physical signs ; so much has often been reported. The same had long been known of vinum ipecac. That the efficacy of emetine in these cases has diagnostic value may indeed be true ; but it does not rest, so far, on any exact observation or critical analysis.]

H. M. H.

PAWAN (J. L.). **A Case of Pyelitis associated with** *Entamoeba histolytica.*—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 199–200.

The author notes the statement of DOBELL, that BAELZ (1883) was the first to describe *E. histolytica* as occurring in the urine. CASTELLANI and CHALMERS recognize amoebic pyelitis as a definite clinical and pathological entity.

The case here reported was that of a woman, aet. 58 years, who had had periodic attacks of dysentery with blood, mucus and *E. histolytica* in stools, relieved by emetine injections. Last attack end of November, 1925; December 27th following she presented signs of acute cystitis (no vaginitis), clearing up with rest and urotropine. On January 6th following she developed acute pain and tenderness in left loin, rigors and T. 104·8° F. Urotropine and alkaline diuretics gave only slight relief. On January 12th microscopic examination of urine revealed pus, bladder and renal cells, and vegetative forms of *E. histolytica.* On 13th catheter specimens of urine, carefully taken, also showed *E. histolytica.* Emetine injections were followed by rapid disappearance of all symptoms and a urine normal on repeated examinations.

H. M. H.

PARDO (J. M.). [**Amebic Dysentery in Children.**]—*Medicina Ibera.* Madrid. 1926. Feb. 27. Vol. 20. p. 245. [Summarized in *Jl. Amer. Med. Assoc.* 1926. July 31. Vol. 87. No. 5. p. 368.]

A nine months old infant, belonging to a healthy Madrid family living in the best conditions, developed dysentery, amoebae being found in the stools. A watchmaker's child had dysentery and amoebic cysts were later found in its stools. The nurse of infant No. 1 had been having a watch repaired; watchmaker and nurse had apparently acted as intermediate carriers of the amoeba. Cure was realized in both cases with emetine—never more than 0·005 gm. per kilogram.

H. M. H.

TANON (L.) & TRABAUD. Cholécystites amibiennes primitives. [**Primitive Amoebic Cholecystitis.**]—*Rev. Méd. et Hyg. Trop.* 1926. May–June. Vol. 18. No. 3. pp. 65–73.

Three cases with symptom complex of cholecystitis. One gave a history of previous diarrhoea and a few active amoebae were found in the stools. In neither of the others was there history of dysentery, nor were amoebae demonstrated in any excretion. In none was there any sign of concomitant hepatic involvement. The diagnosis of amoebic lesion of the gall bladder was based on the pretext that, in fact, disappearance of symptoms and physical signs followed on emetine therapy [a flimsy pretext].

H. M. H.

REHBEIN (Max). Praktische Erfahrungen mit der Yatrenbehandlung der Amöbenruhr. [**Practical Experience of the Yatren Treatment of Amoebic Dysentery.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. July 1. Vol. 30. No. 7. pp. 294–297.

The author's experience of yatren treatment in over 200 cases of acute and chronic amoebic dysentery occurring in Barranquilla, Colombia, leads him to the emphatic statement that for all forms of this dysentery yatren surpasses other known remedies, such as E.B.I., salvarsan and stovarsol.

H. M. H.

MÜHLENS (P.). Cinco años de tratamiento de la disenteria amibiana por el "Yatren 105." **[Five Years of Treatment of Amoebic Dysentery with "Yatren 105."]**—*Rev. Méd. de Yucatán.* 1926. June. Vol. 14. No. 1. pp. 13–14.

Professor Mühlens reports further excellent results from the use of Yatren 105 in amoebic dysentery. Chronic and relapsing cases, even of ten years' duration, rapidly cleared up with doses of 1 gm. thrice daily by mouth. In acute cases the cure was so rapid that the treatment might almost be regarded as abortive in its action. For very chronic cases, rectal administration of 1–3 per cent. solution was combined with pills by mouth. In some instances of bacillary dysentery also cure was effected by this drug.

H. Harold Scott.

DALMEYER (J. J.). "Yatren 105" bei Amöbenruhr. **[Yatren in Amoebic Dysentery.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Oct. 1. Vol. 30. No. 10. pp. 654–656.

The author's experience of emetine and emetine-bismuth-iodide in the treatment of amoebic dysentery in Java had shown the necessity of admitting the patients to hospital for treatment, and had been disappointing in that relapse and subsequent chronicity of dysentery were not rare. In four years' experience yatren has been unfailingly successful, both in acute and chronic and "larval" amoebic dysentery. Stool examinations two and three years after treatment have revealed no relapses. It was not always necessary to admit the patients to hospital for treatment. A course of treatment lasted usually only seven days. Yatren was given *per os* 1 gramme three times a day; some required only ½ gm. t.i.d. Children tolerate it well.

In one case of undoubted post-dysenteric liver abscess yatren brought about cure without operation.

The author concludes with the hope that the advent of yatren will be followed in the near future by the disappearance of sprue in so far as this disease is caused by amoebic dysentery.

H. M. H.

TURNER (R. H.) & JONES (P. H.). **Yatren 105 in the Treatment of Amebic Dysentery. A Preliminary Note.**—*New Orleans Med. & Surg. Jl.* 1926. Oct. Vol. 79. No. 4. pp. 233–237. [6 refs.]

A preliminary report on eight cases of amoebic dysentery. Five cases were "in first attack"; four of them had had symptoms for from ten days to one year, and one for 12 years. Three cases had had previous attacks in from one to 15 years. One of these had been treated many times very thoroughly with ipecac, emetine and stovarsol. Seven showed ulcers in rectum. In all typical vegetative forms of *E. dysenteriae* (*histolytica*), motile and containing red blood cells, were found.

Yatren was given 1 gramme three times a day for first and third weeks—during second week no medication. Only two cases were kept in bed and on soft diet. It was noted that during first week of treatment acute symptoms were relieved and ulcers showed rapid healing. All gained weight, with improved appetite and sense of well-being. Iodism or other unpleasant symptom did not develop. No proof of permanence of cure of these cases can yet be given ; five cases, followed one month and more after treatment, have shown no clinical or microscopic evidence of acute or chronic amoebiasis.

H. M. H.

AKASHI (Shinryu). [**On the Therapeutic Efficacy of Yatren against Amoebic Dysentery.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1925. Nov. No. 2448. [Summarized in *Japan Med. World.* 1926. Feb. 15. Vol. 6. No. 2. p. 43.]

The author " proved " that Yatren kills the amoebae infesting the intestinal lumen and then gradually attacks those in the superficial layer of the intestinal wall and in the ulcers. The killing of the amoeba proceeded first of all by destruction of its protoplasm.

Emetine, on the contrary, did not act on amoebae in lumen of intestine, but against the large forms in the gut tissues. Amoebic dysentery therapy would therefore be most effective by the use of these two drugs.

[The abstract (paraphrased above) gives no indication of the data on which these interesting and clinically important conclusions are based.]

H. M. H.

YOUNG (W. A.) & TUDHOPE (G. R.). **The Pathology of Prolonged Emetin Administration.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. pp. 93–99. [2 refs.]

One of the authors suffered from severe *E. histolytica* dysentery. The amoebae persisting, 18 grains of emetine hydrochloride were given, 1½ grains per diem, 1 grain intravenously and the half-grain subcutaneously. About 14 days after this course of injections he noticed weakness of arms and legs, ankle drop and some muscular wasting. Extensors and flexors were equally affected. No pain subjectively and objectively, none on squeezing muscles and deep pressure on sciatic nerve and its branches. Knee jerks sluggish. The only sensory symptom observed was loss of taste for tobacco and food. Eye accommodation quickly became fatigued. This syndrome—emetine palsy—lasted for one month. WALTERS and KOCH (1917) describe such symptoms, but the authors could find no account of the pathology of the condition. Text books refer to symptoms of neuritis ; this is a misnomer as applied to the direct action of emetine, for by neuritis is meant inflammation of nerve trunk. Their experiments on rabbit and guineapig injected intraperitoneally with emetine revealed that this does not occur. They observed the pharmacological effects of emetine described by PELLINI and WALLACE (1916), except that these workers, with larger doses, found ulcers in stomach and gut. Three of the authors' emetinized animals developed distinct weakness of hind legs.

Post-mortem examination of the injected animals revealed general loss of fat ; dilated and injected heart ; emphysema and injection of lungs ; liver and spleen enlarged and hyperaemic ; kidneys enlarged with haemorrhages on surface ; stomach and intestines injected only, and albuminous urine in bladder.

*Histology.*—Heart muscle.—Hyperaemia, granular and cloudy swelling, nuclear staining poor, haemorrhages between fibres, no fatty change. Lungs.—Hyperaemia, emphysema, alveolar walls thickened. Spleen.—Hyperaemia only. Liver.—Dilated capillaries, granular and cloudy change, necrotic areas, nuclear staining poor. Kidneys.—Hyperaemia, tufts swollen, desquamation of epithelium, cells swollen and granular, haemorrhagic and necrotic area, casts. Suprarenals.—Congestion and haemorrhages in medulla. Muscle.—Granular and cloudy changes. Peripheral nerves.—Wallerian degeneration at distal end. Spinal cord.—Anterior motor horn cells, chromatolysis. No evidence of sensory fibre degeneration.

The findings harmonized with the varying dosage of emetine. With the bigger doses, the process was of an acute nature; with medium doses pathological changes were more marked, more time having been allowed for their production. With less doses it took longer time to produce the same changes, indicating a cumulative action of emetine. This is supported by the fact that palsy may develop some considerable time after cessation of emetine administration. [WALTERS and KOCH demonstrated pharmacologically its cumulative action.] When emetine is given continuously, the safety threshold for 4 lbs. rabbit is less than $\frac{1}{45}$ grain. On this basis for a 12 stone man, eleven doses of 1·9 grain would kill him and 35 doses of 0·8 grain would be distinctly risky. In fact, experience has already shown that more than one grain in 24 hours should not be given, and not more than 12 grains in all. The pathological picture shows that emetine is essentially a protoplasmic poison irrespective of type of tissue. The changes in heart muscle alone would be sufficient to kill. There was no inflammation whatsoever of nerve or its sheath. A motor fibre degeneration as in lead palsy is a possibility. It is doubtful whether recovery of the animal could occur if nerve degeneration were reached, for by then other organs show too advanced pathological changes. Weakness after emetine treatment is due to direct action of emetine on the muscle protoplasm. Exercise is therefore contra-indicated since the heart muscle must also be similarly affected. In cases where heart or kidney is affected, it is advisable to give as small a dose as is possible for the treatment of the dysentery.

[This investigation emphasizes, once more, the importance of accurate diagnosis before treatment of dysentery. The life of a toxic case of bacillary dysentery must be gravely jeopardized by emetine therapy—even by a few " diagnostic " doses.]

H. M. H.

NEWMAN (R. E. U.) & DAVIES (R. M.). **A Comparison of Stovarsol and Emetine Hydrochloride in the Treatment of Amoebic Dysentery.**—*Jl. Roy. Army Med. Corps.* 1926. Oct. Vol. 47. No. 4. pp. 296–300.

Eighteen cases of dysentery at Quetta, in none of which was there history of dysentery in the previous two years. In stools of all, actively motile amoebae with ingested red blood corpuscles were found. Alternate cases were treated with emetine and stovarsol. (*a*) Emetine hydrochloride 1½ gr. in one hypodermic injection daily for 12 days—a total of 18 gr. (*b*) Stovarsol—8 gr. daily for 10 days—a total of 80 gr. All the patients were kept in bed on milk diet, saline aperient in early morning, and Deeks' bismuth treatment—2 drachms bismuth carbonate in half a glass of soda water three times daily. The object of this is to render the acid contents of the colon alkaline, and to increase alkalinity of the portal blood stream. The alkalinity is at its height 2½ hours after administration of each dose of bismuth, and it is then, according to ACTON and KNOWLES, that the emetine should be given. Stools were examined for cysts on six definite occasions after completion of treatment, i.e., 4th, 11th, 18th, 19th, 20th, 21st days. The results are tabulated. Although, as the authors point out, the number of cases is small, yet the results show that stovarsol is nearly as efficacious as emetine hydrochloride. Except for one case of erythema, stovarsol produced no ill after-effects. In allaying the tenesmus and acute abdominal pain at the onset of the illness emetine hydrochloride was the more effective. The danger of cardiac damage must not be overlooked; the authors believe that a course of emetine should not exceed 12 to 15 gr. It is possible that a combination of the two drugs may eventually prove the best method.

H. M. H.

BROWN (P. W.). [**Treatment of Endamebiasis: Stovarsol.**]—*Illinois Med. Jl.* Oak Park. 1926. May. Vol. 49. p. 410. [Summarized in *Jl. Amer. Med. Assoc.* 1926. July 10. Vol. 87. No. 2. p. 126.]

Emphasis is laid on the wide distribution of *E. histolytica.* Emetine is invaluable and is particularly effective in rapidly controlling most of the acute phases of the infection. The organic arsenical compounds seem to be more effective in eradicating the parasite than are ipecac and its derivatives. Cure depends more on persisting with varying treatments than on any one drug. From a small series of cases of ulcerative amoebic proctitis the indications are that recurrence is more likely in this group than in those without gross ulcerative lesions.

H. M. H.

i. YORKE (Warrington) & ADAMS (A. R. D.). **Observations on** *Entamoeba histolytica.* **I. Development of Cysts, Excystation, and Development of Excysted Amoebae** *in Vitro.*—*Ann. Trop. Med. & Parasit.* 1926. Aug. 13. Vol. 20. No. 3. pp. 279–302. With 4 plates. [14 refs.]

ii. —— & ——. **II. Longevity of the Cysts** *in Vitro,* **and their Resistance to Heat and to Various Drugs and Chemicals.**—*Ibid.* pp. 317–326. [9 refs.]

i. It has been generally accepted, the authors state, that cysts of *E. histolytica* will hatch only after subjection to action of gastric and/or pancreatic juices. This hypothesis is probably based on observations of UJIHARA (1914), PENFOLD, WOODCOCK and DREW (1916), CHATTON (1917), and CUTLER (1919). The work of DARLING (1913) had been apparently ignored. DARLING described gradual disappearance of cysts from moist chamber preparations of heavily infected faeces, development of amoebulae within the cysts, and their emergence [this Bulletin, Vol. 1, p. 462]. DOBELL and O'CONNOR (1921) state that "it is certain that the cysts never hatch in the colon, where they are found, or outside the body." SELLARDS and THEILER (1924) showed that *E. histolytica* cysts would hatch when injected intrarectally in kittens. Their very carefully controlled work has been confirmed by HOARE (1925). This reopens the whole subject regarding conditions necessary for excystation of *E. histolytica* and possibly has a bearing on the factors concerned in amoebic dysentery relapse. With the object of throwing further light on the matter the authors have conducted a large number of experiments which are fully described in this paper.

1. They find that *E. histolytica* cysts develop and excyst under suitable conditions *in vitro.*

2. Moisture and a suitable temperature (about 37° C.) are essential for excystation. Passage of cysts through *liquor pepticus* or *liquor pancreaticus* is unnecessary for excystation.

3. Development and excystation can readily be followed in cultures of *E. histolytica* cysts on Locke-egg-serum, and certain other media at 37° C.

4. Great variation in the stage of development of *E. histolytica* cysts may be seen in the freshly-passed faeces of different individuals, and of the same individual at different times. These variations concern chiefly the number of nuclei, the glycogen content, and the percentage containing chromatoid bodies.

5. The youngest cysts are uninucleate and loaded with glycogen ; during development chromatoid bodies appear, the nuclei divide, and glycogen decreases. Later, the cyst becomes quadrinucleate ; chromatoid bodies are well developed, but glycogen is much less evident or entirely absent. When the cyst is mature and ready to excyst, the nuclei are agglomerated and the cytoplasm is homogeneous and without glycogen ; the chromatoid bodies are greatly reduced or absent.

6. They failed to observe any evidence of autogamy in the development of the cysts, but frequently saw chromatin particles apparently extruded from the nuclei immediately prior to, or during, division.

7. The freshly excysted *E. histolytica* contains four closely agglomerated nuclei, and the cytoplasm is very finely-alveolar. It moves in characteristic slug-like manner, with nuclei almost invariably anterior, and drags behind a more or less motionless tail ; as bacteria are ingested the cytoplasm becomes more alveolar and digestive vacuoles quickly appear.

8. In cultures the majority of the quadrinucleate excysted amoebae divide, either directly or indirectly, into four uninucleate individuals, but in a certain proportion the cytoplasm fails to divide and multinucleate individuals are formed. Here again no indication of autogamy was observed.

9. They describe a method of obtaining concentrated washed suspensions of *E. histolytica* cysts. Inoculation on Locke-egg-serum or other suitable medium with such suspensions is the simplest way of obtaining excellent cultures of vegetative forms.

ii. The usually accepted method of determining the vitality of cysts of *E. histolytica* has been that of KUENEN and SWELLENGREBEL (1913) : dead cysts stain with weak eosin-water solutions, and living cysts do not. It has been impossible to decide whether this is wholly true. Inoculation of kittens means at least a great sacrifice of animals. The longevity of the cysts is, from the public health point of view, a matter of fundamental importance. Records of various workers indicate that cysts live longer in water than in faeces, and at low temperatures than at higher or at body temperature. Under favourable conditions cysts have been stated to survive for 29 days (KUENEN and SWELLENGREBEL), for over 30 days (WENYON and O'CONNOR), up to five weeks (DOBELL), 153 and 211 days (BOECK).

The authors describe their experiments. Their test for longevity of cysts is based on the fact that they can readily be cultured *in vitro*. They find that :—

1. The eosin reaction is not a reliable criterion of viability of *E. histolytica* cysts. Those which stain with dilute eosin are dead, but not all those which do not stain are alive.

2. *E. histolytica* cysts begin to die fairly rapidly in faeces kept at laboratory temperature (16° to 20° C.) for 3 or 4 days, and all are dead within about 10 days ; approximately the same result is obtained when the faeces is kept at 0° C. in the ice chest.

3. Washed suspensions of *E. histolytica* cysts in water live longer, especially if kept at 0° C., but even under these conditions live cysts are not found after three weeks.

4. *E. histolytica* cysts survive a temperature of 45° C. for 30 minutes, but are killed within five minutes by a temperature of 50° C.

5. *E. histolytica* cysts are remarkably resistant to emetine and to yatren, and relatively so to hydrochloric acid and chlorine. The last-named in strengths far in excess of that used in the bacteriological sterilization of water has no effect on the cysts.

6. The following chemicals were found to be lethal for the cysts in the strengths as stated, both at 37° C. and at laboratory temperature: $HgCl_2$ 1 in 2,500 ; formaldehyde, 0·5 per cent. ; carbolic acid, 1 in 100 ; lysol, 1 in 100 ; " Milton," 2·5 per cent. ; pot. permang., no effect at 1 in 100 ; yatren, no effect in 5 per cent. solution ; emetine HCl, no effect in 5 per cent. solution.

H. M. H.

THOMSON (Margaret Dora). **Experimental Amoebiasis in the Rabbit.**—*Univ. California Public. Zool.* 1926. June 23. Vol. 29. No. 2. 23 pp. With 5 text figs. [24 refs.]

Carnivores have been found to be, apparently, the most suitable animals for obtaining experimental infections of *E. dysenteriae.* LÖSCH (1875) infected a dog, but by far the greatest amount of experimental work has been performed with cats which, like the dog, acquire a fatal dysentery. Rodents have appeared to be rather refractory to infection by *E. dysenteriae.* The author reviews and discusses the attempts (some reported successful) of various workers with rat, mouse, guineapig, rabbit and gerbil, and reports fully her own experiments.

Motile amoebae in bloody mucous stools of infected cats failed to infect a half-grown rabbit when rectally inoculated. Of three rabbits fed mature cysts of *E. dysenteriae* obtained from chronic human cases of amoebiasis one acquired an infection and died 30 days after the initial feeding. No cysts were ever found in the stools during experimentation, nor at autopsy in the intestine of the infected rabbit. The infection was localized in the caecum. Microscopical examination of sections of the caecal wall showed an amoebic invasion of the mucosa, sub-mucosa and the circular muscular layer. Lymph nodes and channels were heavily infected. Amoebae were also found in the lumen of the blood vessels. [The text figures illustrate, in so far as microphotographs can do so, this invasion of the tissues of the gut.] Five dogs were fed human faeces containing mature cysts of *E. dysenteriae.* No infection resulted. Unsuccessful attempts were made to produce an infection in two young kittens with cysts from an infected rat and later with cysts from chronic human cases. A few months afterwards one of them was infected by rectal inoculation with dysenteric stools from cats with acute amoebiasis.

H. M. H.

CARVAILLO (R.) & SAUTET (J.). Recherches expérimentales sur quelques localisations extra-intestinales de l'amibose. [**Extra-Intestinal Infections with Amoebae: Experimental.**]—*Ann. Parasit. Humaine et Comparée.* 1926. Oct. 1. Vol. 4. No. 4. pp. 349–351, [10 refs.]

Recent observations, especially those of PETZETAKIS and Madame PANAYOTATOU, on urinary and pulmonary amoebiasis, induced the authors to attempt to reproduce experimentally these amoebic manifestations. They employed cultures of *Entamoeba dysenteriae* (made by BRUMPT, from a patient with amoebic dysentery, which had not responded to the usual treatment). This culture, after the 78th passage (at the commencement of their experiments) killed a kitten to which it had been intrarectally inoculated,

1. The external urinary meatus in seven kittens was sealed by collodion tampon. Median supra-pubic cystotomy was performed and the bladder inoculated with the amoebae. After two hours the meatus was unsealed. (Inoculation by catheterization of bladder was not done on account of the narrowness and fragility of the kitten's urethra.) Three kittens died in the first week from peritonitis and infiltration of urine. At autopsy one only showed a 3 mm. ulceration of the bladder mucous membrane; sections of this ulcer (haemalum and eosin stained) revealed no amoebae. No other sort of lesion in bladder was found in any of the three. The authors note that in face of this, the finding of " dysenteriform " ulcers by cystoscopy does not suffice for a diagnosis of amoebiasis. The four other kittens tolerated the operation and were killed after ten days. A daily examination of their urine had revealed no amoebae. At autopsy none showed any lesion of the bladder. On an eighth kitten cystostomy was performed. This permitted two successive inoculations of the bladder with the amoebae, and repeated examinations of the urine. At autopsy no lesion of bladder was found.

2. BRUMPT inoculated kittens with the amoebae by tracheal puncture. At autopsy no lesion was found. The authors repeated this experiment with one kitten—at autopsy no macroscopic or microscopic lesion of the pulmonary passages or mucous membranes, nor amoebae, could be found.

3. Pleural inoculation provoked purulent effusion which killed the kitten in 24 hours. Examination of the pleural effusion and sections of lung and pleura (haemalum-eosin stained) revealed no amoebae. BRUMPT had inoculated kittens intrapleurally and intraperitoneally with cultures (different from that used by the authors) of *E. dysenteriae* and Trichomonas. With the amoebae the result was negative, but Trichomonas survived perfectly.

[Now the kitten is peculiarly susceptible to infection with the amoeba of dysentery, and many will agree with the authors that the proofs for the amoebic nature of most of the reported human urinary and pulmonary cases are not entirely conclusive.] H. M. H.

CRAIG (Charles F.). **A Simplified Method for the Cultivation of** *Endamoeba histolytica.*—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 333–339. [4 refs.]

(1). Locke solution containing one part to seven of inactivated human, horse or rabbit blood serum was found very efficient in the cultivation of *E. histolytica*. Best results were obtained when inactivated human blood serum was used.

(2). Excellent growth of *E. histolytica* in this medium demonstrates that coagulated egg or blood agar slants, used as a substratum, are not essential for growth of this species; and that neither egg nor blood is essential as food supply.

(3). In this medium *E. histolytica* remained alive and motile for 11 days, and successful transfers were obtained after eight days. Best results were obtained by making transfers every 24 or 48 hours.

(4). Transfers of *E. histolytica* in this medium made at intervals of 24 and 48 hours were continued for over three months, during which time the amoebae did not change in morphology or in reproductive ability.

H. M. H.

SAUTET (J.). Action de l'amidon sur les cultures d'amibes. [**Action of Starch on Cultures of Amoebae.**]—*Ann. Parasit. Humaine et Comparée.* 1926. Oct. 1. Vol. 4. No. 4. pp. 345–348. [10 refs.]

The author describes his experiments and technique. He finds that rice starch grains, sterilized or not, enrich cultures of amoebae and prolong their life. Other starches, e.g. arrowroot, wheat, potato, manioc, chestnut, appear to have no effect on the cultures. Drbohlav's starch medium, in six cases, gave better results than Dorset medium for isolating amoebae.

H. M. H.

ST. JOHN (J. H.). **Differential Characteristics of the Amoebae of Man in Culture.**—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 319–331. With 22 figs. on 3 plates. [2 refs.]

The method of culture for detection of Entamoebae has obvious advantages over the usual hit-or-miss procedures. Were it not for the involved technique incident to staining, it is believed that more clinicians would become interested in attempting to differentiate the amoebae. By culture on Locke-egg serum media (BOECK and DRBOHLAV) a ready technique is at hand for the study of the different characteristics of various species of amoebae. The author's interesting paper shows that in culture the definition of the visible structure and observation of the movements peculiar to *E. histolytica, E. coli, E. nana, Iodamoeba williamsi, Dientamoeba fragilis* give valuable aid in differentiating these amoebae (found in man). He found no remarkable change in structural detail or behaviour. The main identifying features conform closely to the accepted descriptions. In culture, however, the unlimited number of amoebae available for study permits of greater emphasis being placed on minor individual peculiarities. A full description of these features and peculiarities is given in the paper.

As addendum he gives the results of a single examination by method of culture of stools of 73 members of the class at the Army Medical School.

| | | | |
|---|---|---|---|
| *Positive.* | Flagellates | 5 | 23 or 31 per cent. |
| | Amoebae | 11 | |
| | Both | 7 | |

*Amoebae species found.*—*E. histolytica* 7–9·6 per cent.; *E. coli* 5–6·8; *D. fragilis* 1–1·3; *I. williamsi* 1–1·3; and *E. nana* 4–5·9 per cent. *Flagellate species found.*—Chilomastix 6–8·2 per cent.; Trichomonas 5–6·8; Pentatrichomonas 1–1·3; Tricercomonas 3–4 per cent.

H. M. H.

KESSEL (John F.) **Some Similarities between the Dysentery Amoeba of the Monkey and of Man.**—*Proc. Soc. Experim. Biol. & Med.* 1926. May. Vol. 23. No. 8. pp. 675–676. [2 refs.]

The dysentery amoeba of the monkey and that of man are so much alike in structure as to have evoked a suggestion of their identity. The author, by means of cysts, succeeded in infecting two clean monkeys with *E. histolytica* from man, and from the faeces of these monkeys he subsequently infected two clean cats, in whose gut the typical lesions of amoebic dysentery were demonstrated; and he offers the results of these experiments as reasonable evidence of the specific unity of the two stocks—from man and monkey respectively.

[On the other hand, Das GUPTA, in India, was unsuccessful in attempts to infect kittens with *Entamoeba nuttalli* obtained by culture from a moribund monkey, *Macacus rhesus*.]

A. Alcock.

KUDO (R.). **Observations on** *Dientamoeba fragilis*.—*Amer. Jl. Trop. Med.* 1926. July. Vol. 6. No. 4. pp. 299–305. With 21 figs. on 1 plate. [10 refs.]

These observations were made on material from a hospital patient in Illinois who had been suffering for some time from dysentery suspected to be amoebic. The organism specified in the title was found in enormous numbers in stools (along with small numbers of *Chilomastix mesnili*, *Entamoeba coli* and *E. nana*).

Some description is given of *Dientamoeba fragilis* and of its nucleus in division. Binucleate individuals were found in only 12·2 per cent. of 2,000 observed at random.

A. A.

HOARE (C. A.). **Sections of the Intestine of a Kitten presumably infected with** *Entamoeba histolytica* **by Rectal Injection of Cysts alone. [Laboratory Meeting Demonstration.]**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1925. Nov. 19 & Dec. 17. Vol. 19. Nos. 5 & 6. pp. 277–278.

The view had been generally held that *E. histolytica* cysts were incapable of liberating the enclosed amoebae until the cysts had been passed out of the body and ingested by another individual. SELLARDS and THEILER (1924) infected kittens by injecting into the large intestine material containing cysts alone. The author obtained faeces from the London Hospital, which on examination, when 24 hours old, revealed cysts only. A portion was emulsified in tap water, allowed to settle for half an hour, and centrifuged. This procedure was repeated twice. Several examinations of the faecal sediment revealed cysts only. 5 cc. of the emulsion was injected into a kitten per rectum, and its anus was sealed by cotton-wool-collodion-plug. The plug was removed four days later, when examination of faeces revealed no amoebae. Three weeks after inoculation the kitten passed blood and mucus for three days, during which time stools revealed no amoebae. The stools then became normal. The kitten was killed 41 days after inoculation. Macroscopically the large intestine appeared normal and without ulceration. Microscopic examination of sections revealed amoebae concentrated in patches at base of the mucous membrane. The author notes that, although the possibility of individual active forms surviving in the inoculated material cannot be entirely excluded, yet as this material was 24 hours old, revealed cysts only, and was several times washed, before inoculation, it is highly probable that the infection in the kitten was produced by the cysts alone.

H. M. H.

BRUMPT (E.). Infection expérimentale du chat par l'*Entamoeba coli* Loesch, 1875 Schaudinn emendavit 1903. [**Experimental Infection of Cat with** *Entamoeba coli.*]—*Ann. Parasit. Humaine et Comparée.* 1926. July 1. Vol. 4. No. 3. pp. 272–285. With 6 text figs. [25 refs.]

The author gives a full account of his experiments. He reviews briefly previous attempts of various workers to infect the cat with *E. coli.* He himself had failed before using the method, discovered by BOECK and DRBOHLAV, of occlusion of the animal's anus. His successful infection of the cat, in this case, was due to the fact that an invagination of the small intestine had produced intestinal stasis. SELLARDS has clearly demonstrated that faecal stasis promotes experimental amoebic infection of the gut. *E. coli* has been held to be nonpathogenic for man. Theobald SMITH 1910 showed that the pig amoeba (*E. polecki* Prowazek 1912—*E. suis* Hartmann 1913) could multiply in the intestinal ulcerations of *la peste porcine.*

HAMMERSCHMIDT has described in four human cases, at autopsy, penetration of the gut wall by amoebae presenting the morphological character of *E. coli.* Other authors, whose findings are briefly mentioned, have more or less incriminated *E. coli* as a pathogenic agent in man. The author's experiments here detailed show that, perhaps in exceptional circumstances, *E. coli* can penetrate small ulcerations in the gut of a kitten which it has itself produced, or which were caused by *E. dispar* with which the *E. coli* was associated in this experiment. The author claims that this accidental histotropism of *E. coli* in the kitten, denotes that this amoeba can become pathogenic for man in certain favourable conditions.

[The photomicrograph accompanying the text shows what may well be amoebae in the gut tissues of the kitten, but fails to demonstrate them as *E. coli.*]

H. M. H.

i. PETRIDIS (Pavlos Ar.). Un cas d'abcès du foie traité sans succès par les ponctions répétées et les injections d'émétine et définitivement opéré. [**Liver Abscess—Aspiration—Emetine Injections—Incision.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. July 1. 3rd Ser. Year 42. Vol. 50. No. 23. pp. 1140–1145.

ii. HARRISON (C. H.). [**Treatment of Chronic Amebic Dysentery and Ameba Carriers with Stovarsol.**]—*U.S. Veterans' Bureau Med. Bull.* Wash. 1926. May. Vol. 2. p. 447. [Summarized in *Jl. Amer. Med. Assoc.* 1926. July 17. Vol. 87. No. 3. p. 202.]

iii. PETRIDIS (Pavlos Ar.). Péritonite généralisée purulente consécutive à la rupture d'un abcès du foie de la partie postérieure de la face convexe du lobe droit et ayant simulé la péritonite par perforation intestinale typhoidique. **[Peritonitis following Rupture of Liver Abscess.]**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. July 1. 3rd Ser. Year 42. Vol. 50. No. 23. pp. 1145—1149.

iv. URIBE (Cesar). **Nuclear Division in the Trophozoites of** *Endamoeba histolytica.*—*Proc. Nat. Acad. Sci.* 1926. May. Vol. 12. No. 5. pp. 305–311. With 24 figs. on 1 plate. [4 refs.]

v. PAL (B. D.). **Paresis following Emetine Injections.**—*Indian Med. Gaz.* 1926. Oct. Vol. 61. No. 10. pp. 498–499.

i. The condition was a sequel to amoebic dysentery. Amelioration followed aspirations and emetine injections, but as the patient's condition still remained grave, incision was carried out and *two litres* of chocolate coloured pus were evacuated.

ii. Good results were obtained by stovarsol 0·5 gm. by mouth three times daily. Colonic irrigation with 4,000 to 8,000 cc. physiologic sodium chloride solution, followed by 1 in 500 mercurochrome, were routine procedures in these cases.

iii. At autopsy, scrapings of the abscess wall revealed entamoebae.

H. M. H.

iv. The author has been studying the phenomena of nuclear division as exhibited in stained specimens of trophozoites of *Entamoeba histolytica,* and he here describes and illustrates (in some instances by microphotography) the results. The paper is one for the discriminative nucleologist.

A. A.

v. The author records briefly four cases of paresis in adults after three, two, six, and an unstated number of 1 grain injections of emetine hydrochloride. [It does not appear whether any of them had received a previous course of emetine injections.]

A. G. B.

## BACILLARY DYSENTERY.

BREAKEY (S. F.). **A Case of Infection with** *Bacillus dysenteriae* **(Flexner) presenting Unusual Symptoms. With Bacteriological Notes** by CLAYTON (F. H. A.).—*Lancet.* 1926. Sept. 11. pp. 541–542. [3 refs.]

In a certain number of cases symptoms produced by Flexner bacillus are entirely different from classical symptoms of dysentery. SAVAGE and Bruce WHITE recorded an outbreak of " food poisoning " due to Flexner bacillus, and a similar series of cases with sudden onset has been reported by BAINBRIDGE and DUDFIELD. The case here reported finds an almost exact parallel in a case of Flexner infection described by MARSHALL in 1909.

A girl, aged seven years, apparently quite well up to onset of vomiting (once). That night 20 or 30 calls to stool, but very little passed and no blood or slime noticed. In morning " excited and strange in manner ; " sent to hospital, where were found exaggerated knee jerks, dilated pupils, photophobia, temperature 102·6°, left lateral decubitus with flexion of thighs and legs. Later, complete unconsciousness and vomiting of small quantity bile-stained fluid. Convergent squint left eye. A ribbon stool, greenish, no blood or mucus, passed. Later still, retraction of head, spasticity of limbs and positive Kernig. Lumbar puncture yielded clear fluid not under tension. Ever deepening coma terminating in death. Laboratory examination of C.S.F. revealed nothing pathological. Culture from rectal swab showed Flexner dysentery bacillus, confirmed by testing against Flexner serum. At autopsy, naked eye inspection revealed nothing abnormal in intestines or appendix, nor in brain—no pus, turbid fluid or tubercles. There was some slight congestion in basilar region around pons.

H. M. H.

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CHATTERJEE (Sisir C.). **A Case of Bacillary Dysentery.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. pp. 393–394.

The diagnosis of bacillary dysentery in a woman of 30 at Nagpur was arrived at by the presence of: (1) High fever; (2) Blood and slime in stools, and (3) Failure of emetine and castor oil (administered by the author's assistant.).

Saline bowel washes were followed by subsidence of fever, and total disappearance of all symptoms occurred after a second dose of anti-dysenteric serum given intravenously. The author remarks that bacillary dysentery is not common in Nagpur.

The editor, *Indian Medical Gazette*, appends a note as follows:—

"There is an almost universal habit in India of administering emetine in almost all cases of dysentery, irrespective of their causation. If the stools of Nagpur dysentery cases were examined bacteriologically, it would be found that what holds good for Calcutta, for most of India, holds good for Nagpur—that bacillary dysentery is some five or six times as common as is amoebic dysentery."

H. M. H.

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SAISAWA (Kozo) & TANABE (Bunshiro). **Notes on Healthy Carriers of Dysentery Bacilli.**—*Philippine Jl. Sci.* 1926. July. Vol. 30. No. 3. pp. 335–346.

A valuable, interesting and thorough investigation at Tokyo of which full details are given.

(1). Among 2,847 recruits for the Japanese army, the authors found 15 (0·52 per cent.) healthy carriers of dysentery bacillus. Apparently healthy carriers were also found among the soldiers living in barracks in Tokyo. Out of 4,648 examined, 15 (0·32 per cent.) were found to harbour the dysentery bacillus.

(2). From the total of 30 carriers they isolated Y (Hiss-Russell) type in 17; Flexner in 10; nonfermenter of mannite in 2; and typical Shiga in only one case.

(3). In the majority of the carriers longer or shorter periods of positive culture alternated with periods of negative culture—negative periods were sometimes as long as four weeks.

(4). The carrier state persisted in some for as long as 13 weeks after detection.

(5). Sigmoidoscopy revealed, in most of the cases, ulceration or inflammation of the lower part of sigmoid flexure and of the rectal ampulla.

(6). Sigmoidoscopy enabled the authors to obtain more regular results than did stool cultures. In cultures made from ulcers, mucus, or pseudomembrane, colonies, sometimes almost pure, of the dysentery bacilllus were obtained without difficulty.

(7). The authors conclude that the great majority of so-called healthy or contact dysentery carriers are nothing but very mild cases of dysentery with such slight pathological and clinical manifestations that an infection by *B. dysenteriae* is not suspected.

H. M. H.

ELKELES (Gerhard) & SCHNEIDER (Alice). Zur Bakteriologie der Ruhr, besonders der diesjährigen [**Bacteriology of Dysentery.**]—*Deut. Med. Woch.* 1926. Aug. 20. Vol. 52. No. 34. p. 1424. [5 refs.]

The well known difficulty of a definite bacteriological specification in acute dysentery is emphasized. This has reference, of course, particularly to the slightly toxic or pseudodysenteric bacilli as distinguished from the well-defined Shiga-Kruse bacilli. The former have been divided up into a series of races numbered alphabetically, with the numbering so far reaching from A to J. The authors advise the practitioner to regard every case of typical acute clinical dysentery as "infective," that is to say bacillary dysentery, to report it as such, and to despatch the stool for laboratory examination as soon as passed.

W. F. Harvey.

SCHÖBL (Otto) & VILLAAMIL (Rita). **Contribution to the Serologic Grouping of** *Bacillus dysenteriae* **based upon the Quality of Antigen and Normal Agglutinins.**—*Philippine Jl. Sci.* 1926. May. Vol. 30. No. 1. pp. 1–38. [7 refs.]

The results of tests with one strain each of *B. dysenteriae* Shiga and Flexner showed that normal sera of horse, mule, sheep and goat agglutinated both in diminishing degree and the sera of guineapig and monkey agglutinated neither. Rabbit serum was peculiar, as it agglutinated the Flexner but not the Shiga type. This peculiarity was investigated for a large number of strains of the two types, and in addition, the effect of boiling upon the spontaneous agglutinability of suspensions. All the Flexner strains were agglutinable by normal rabbit serum but only one showed agglutination upon boiling for one hour. Of the Shiga series more than half were inagglutinable by rabbit serum. The inagglutinable strains showed no agglutination upon boiling. The agglutinable Shiga strains gave only a loose agglutinate and were divisible into a larger sub-group of members, which agglutinate spontaneously on boiling, and a smaller which do not. Flexner types of organism gave regular adsorption results, but the Shiga types were irregular in this respect. All degrees of agglutinability were found in these Shiga types in respect of normal rabbit serum, homologous immune horse serum, adsorption, simple boiling and acid; this is regarded as due to degeneration of antigen rather than to the presence of real agglutinin, such as is found for Flexner strains in normal rabbit serum.

W. F. H.

CHANNON (Hilda A.). **Identification of the Sonne Dysentery Bacillus in England.**—*Jl. Path. & Bact.* 1926. Oct. Vol. 29. No. 4. pp. 496–497. [5 refs.]

The identification of the Sonne bacillus here set out is complete. Examination of the faeces of a patient, with previous history of a dysentery attack in Egypt, now suffering from diarrhoea, vomiting and wasting for three months, showed neither amoebae nor cysts. The lactose fermenting organism, isolated from the stools, agreed morphologically and in cultural reactions with a Sonne bacillus strain from the National Collection. The organism was pathogenic to rabbits: an agar slope suspension killed intraperitoneally within 12 hours. The Sonne bacillus occurs, according to CRUICKSHANK and KERRIN, rather commonly in Aberdeen, especially in outbreaks of dysentery in children. The serological tests of the isolated organism served to complete the identification. An antiserum prepared to this organism agglutinated both it and the Sonne bacillus at a titre of 1 in 640, while the Sonne bacillus antiserum agglutinated both organisms at 1 in 320. Complete cross absorption of agglutinins occurred with both sera. Neither antiserum agglutinated Flexner and Shiga bacilli.

W. F. H.

SARDJITO (M.). Onderzoek op de toxinevorming van Shiga-Kruse dysenteriebacillen in bouillon met verschillende waterstofionen-concentratie. [**Variation of Toxin Formation by Shiga-Kruse Bacilli with Hydrogen-ion Concentration.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 3. pp. 337–341. With 1 chart. [7 refs.]

The pH values of the test bouillons were 6·75, 7·1, 7·5 and 8·3; samples of 1 cc. were taken daily, diluted with distilled water to 3·5 cc., and tested colorimetrically for reaction by addition of 0·5 cc. of either 0·02 per cent. phenol-red or 0·04 per cent. brom thymol blue. In all five bouillons the reaction fell after the first day to near the turning point, after which the alkalinity rose, so that bouillon of initial reaction pH 7·5 reached 7·8 after the 10th day; all the other bouillons had reached this same point by the 17th day.

For the test of toxin formation, portions of each of the bouillons were filtered through a Berkefeld N candle on the 3rd, 7th, 14th and 21st day of culture and doses of 0·01, 0·02, 0·03, 0·04 and 0·05 cc. of the filtrate injected intravenously in white mice. The results for these cultures were: (1) Toxin formation did not begin till after the 3rd day; (2) toxin formation only began after a week in some; (3) The period of highest toxicity was between the 14th and 21st day; (4) the strongest toxin was obtained from the culture of initial reaction pH 7·5 whose filtrate after the 14th and 21st days was lethal in an intravenous dose of 0·01–0·02 cc.

W. F. H.

TADOKORO (Ryokichi) & SUGA (Kichinosuke). **Physiological Action of Dysentery Toxin.**—*Keio Igaku* (*Jl. Keio Med. Soc.*). 1925. July. Vol. 5. No. 7. [Summarized in *Japan Med. World.* 1926. Mar. 15. Vol. 6. No. 3. pp. 67–68.]

Perfusion of highly virulent toxin through isolated rabbit intestine increased peristalsis, and in larger doses caused paralysis. As, however, this action was exhibited after heating for one hour at 85° C., the authors conclude that it was due to other factors than the toxin itself. The clinical symptoms in dysentery, it is suggested, may be due to the demonstrable stimulation of the accessory sympathetic nerves of the large intestine, instead of to a non-specific hypersusceptibility arising from pathological change in the mucous membrane.

W. F. H.

CLIFFORD (Stewart H.). **Rôle of the Dysentery Bacillus in Arthritis Deformans (Type I). A Preliminary Report of Seven Cases, with a Note on the Intradermal Reaction in Dysentery.**—*Amer. Jl. Diseases of Children.* 1926. July. Vol. 32. No. 1. pp. 72–83. With 2 text figs. [10 refs.]

The first description of the arthritis following a definite clinical attack of dysentery is credited to SYDENHAM in 1672 following the dysentery epidemics of 1668–1672 in England. Since 1917 many observers have reported lt. That the symptom complex called arthritis deformans of type 1 may, in some cases, be the arthritis following an unrecognized dysentery bacillus infection is the possibility raised by the observations reported in this paper. Seven cases of arthritis deformans are reported, in four of which there was evidence of there having been either an active or a past infection with *B. dysenteriae*, Flexner. The literature shows arthritis following a typical dysentery to be a well-established clinical entity that may occur as long as four weeks after the acute attack. It is possible to have a dysentery bacillus infection without its producing a clinical syndrome recognizable as dysentery. Dysentery should be considered as an aetiologic factor in arthritis deformans (type 1), and ruled out only after bacteriological studies and agglutination reactions, using a complete series of antigens, prove to be negative.

*Intradermal reaction.*—A formalinized vaccine of the organism isolated in one of the cases was used, 0·1 cc. being injected intradermally into all of the patients and their attendants ; 24 hours later all showed oval, erythematous, raised diffused reactions. In every instance this pseudo-reaction had completely disappeared by end of the third day. In three of the four patients as the pseudo-reaction disappeared, the site of the original bleb became progressively deeper crimson and more indurated, until by the fourth day red indurated papules had been formed.

H. M. H.

BROKMAN (H.) & POPOWSKI (S.). **The Relative Frequency of the Positive Dysentery-Skin Reaction at Different Ages.**—*Jl. Immunology.* 1926. July. Vol. 12. No. 1. pp. 45–46. [3 refs.]

Brokman had previously determined the dependence of an intradermal skin reaction on the presence or absence of Shiga-Kruse antitoxin in the blood, as in the Schick test for diphtheria. In the present study from the University-Clinic for sick children in Warsaw, the authors use, as test dose, 1-100 of the lethal dose of toxin per kilogram of rabbit. Their results for 39, 262, and 374 persons examined at the age periods 0–3, 4–15, and 16–23, were 51, 27 and 59 per cent. of positive reactions.

W. F. H.

MULLER (L.). Milieux pour la recherche des bactéries du groupe typho-dysentérique. [**Medium for Typho-Dysentery Organisms.**]—*C. R. Soc. Biol.* 1926. Sept. 21. Vol. 95. No. 27. pp. 728–730. [2 refs.]

The medium is a simplification of one previously described.

Four solutions are required : No. 1, 40 gm. ferric pot. tartrate in 200 cc. distilled water, with the addition of 4 cc. liquid phenol ; No. 2, 250 gm. lactose in 600 cc. distilled water ; No. 3, 40 gm. crystalline pot. ferrocyanide in 200 cc. distilled water: No. 4, Normal soda solution. These are well cooled. Only Nos. 2 and 3 require sterilization by heating for 30 min at 100° C. Mix Nos. 1 and 2 solutions. Add 40 cc. of No. 4 solution and then No. 3 solution. This stock reagent mixture will remain sterile, even though frequently drawn upon for use. The actual medium is prepared by mixing 9 or 10 parts nutrient agar with 1 part of the stock reagent. Plates of this medium will keep for three weeks at room temperature and still longer in the ice chest.

*B. typhosus* colonies are orange-tinted on the brown medium, while *B. coli* colonies are blue.

W. F. H.

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SARDJITO (M.). Immunisatie tegen bacillaire dysenterie door middel van bacteriënlysaat van Shiga-Kruse-bacillen, verkregen na inwerking met bacteriophaag. [**Immunization against Bacillary Dysentery by Means of a Bacterial Lysate of Shiga-Kruse Bacillus, obtained by Action of the Bacteriophage.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 4. pp. 502–521. [12 refs.]

Sardjito gives an account of previous attempts of active immunization against bacillary dysentery. Vaccines prepared by KOLLE's method are too toxic. Admixture of anti-dysenteric serum diminished the toxicity but interfered with the degree of immunity which the vaccine is able to procure. BESREDKA'S sensitized vaccine is also useful only to a certain extent. D'HERELLE's experiments offered the possibility of a new departure in this respect. In D'HERELLE's own experiments with Shiga-Kruse bacillus the lysate proved to be non-toxic whether administered *per os* or subcutaneously. The original toxins of the bacillus have been thoroughly altered, whilst at the same time the immunizing power of the lysate is much higher than that of the original strain of the bacillus. D'HERELLE ascribes the immunizing action of the lysate to the dissolved bacterial antigens, and not to a direct action of the bacteriophage itself.

In the author's own experiments two strains of bacteriophage were used in 73 rabbits. The lysate of Shiga-Kruse bacillus was still toxic, which Sardjito ascribes to a higher degree of virulence of the strain he used. It lost, however, its toxicity by treatment with formol, which left the immunizing power unaffected. 1 cc. of the formol treated lysate (after neutralization of the irritating formol by admixture of caustic soda) was injected subcutaneously in human subjects without any trouble to speak of. The author recommends this vaccine for a trial in practice.

W. J. Bais.

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SASAKI (R.) & MANABE (K.). Ein Fall von Kinder-Dysenterie mit Darmblutung. [**Dysentery in a Child with Intestinal Haemorrhage.**]—*Oriental Jl. Dis. Infants.* 1926. Apr.–July. Vol. 1. No. 2–3. German Summary p. 80. [In Japanese.]

An account of a child five years and nine months old, with dysentery, passing much blood in stools, from which a Flexner bacillus was cultured. The blood serum was strongly Wassermann positive. The very bloody stools, in this case, possibly were due to syphilis, but the same authors observed another child, two years and five months old, with the same symptoms, in whom the blood serum was Wassermann negative.

H. M. H.

WELCH (T. B.). **Castor Oil** *versus* **Saline Aperient.** [Correspondence.]—*Lancet.* 1926. Sept. 25. p. 681.

Dr. Welch briefly recapitulates his successful results from the use of castor oil in bacillary dysentery. A full report appeared in *Kenya Med. Jl.* 1924. Aug., and has already received notice in this *Bulletin*, Vol. 22, p. 20.

H. M. H.

## MIXED AND UNCLASSED DYSENTERY.

WINKLER (Ludwig). *Lamblia intestinalis* und Cholecystitis. [*L. intestinalis* **and Cholecystitis.**]—*Med. Klin.* 1926. Aug. 27. Vol. 22. No. 35 (1133). pp. 1340–1341.

The author states that though hitherto *Lamblia intestinalis* has been denied pathogenicity, recent observations by various workers [a few of whom he refers to] have incriminated this protozoon as causative agent in catarrhal bowel complaints. It is certain, however, that the flagellate can also be found as a normal harmless inhabitant of the human gut. WESTPHAL and GEORGI had found it twice in 100 cases investigated by stomach tube. The author in 23 cases investigated by duodenal tube had found it once—in a case with anorexia and stomach derangement. The tube revealed a definite duodenitis with scanty lamblia. None was found in the stool. Besides entero-colitis, WESTPHAL and GEORGI had recorded cases indicating that lamblia could set up disease of the bile passages. The author now records a case (male aet. 26 years) of chronic relapsing entero-colitis with definite physical signs and symptoms of cholecystitis, from whom, by duodenal tube, was obtained thick turbid brownish yellow, bacteriologically sterile, gall bladder secretion, containing leucocytes, epithelial cells, mucous shreds and *Lamblia intestinalis.* These parasites were also found in the first clear yellow fluid withdrawn through the duodenal tube. At that time no lamblia were found in the stool which was free from blood and mucus. Later, during a period of diarrhoea, active and encysted lamblia were found in the stools. Culture of stool gave no pathogenic bacteria. Treatment by emetine, followed by a course of Carlsbad salts, was effective in ridding the patient of all symptoms. One month later the duodenal tube revealed no pathological changes. Under emetine the lamblia became scanty and motile forms were found only at rare intervals.

H. M. H.

PARODI (Silvio A.) & NIÑO (Flavio L.). La " Giardia intestinalis " en nuestro país. Su frecuencia y rol patógeno. [**The Prevalence and Pathogenic Action of** *Giardia intestinalis* **in Argentina.**]—*Semana Méd.* 1926. Sept. 16. Vol. 33. No. 37 (1705). pp. 715–718. With 1 text fig.

Infection by *Giardia intestinalis* appears to be comparatively frequent in Buenos Aires. Some statistics show a percentage of 10·1 in over 2,000 cases examined; others as much as 25 per cent. The prevalence is greater amongst children, and it is owing to disregard of age that the findings differ so widely. In adults, women are more attacked than men, because of their closer contact with the children.

Examination of 2,011 specimens of faeces at the Hospital de Clínicas revealed Giardia in 6·51 per cent. In 1·5 per cent. it was the only parasite found, in 2·63 in conjunction with *E. histolytica*, in 0·53 with *Trichomonas hominis*, and in 1·85 with Blastocystis.

The authors state that Giardia stools are of a fetid odour, diarrhoeic, yellow, with mucus and at times blood. The symptoms are colic, tenesmus and epigastric pain. The course is usually chronic with exacerbations. After trying various forms of treatment, stovarsol and Yatren 105 amongst them, without effect, he obtained cure of an obstinate case by the use of " Narsenol Poulenc."

Experimental administration to cats, rats, and other laboratory animals may result in death, and at autopsy the mucosa of the caecum, ascending colon, and the lower part of the small intestine is inflamed, ulcerated, and perhaps even necrotic, with petechial haemorrhages. The author is of opinion that Giardia has definitely a pathogenic action.

H. Harold Scott.

PAWAN (J. L.). **A Case of** *Giardia intestinalis* **treated with Stovarsol.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 197–198.

Male, age 2½ years. Abdominal pain, fever, very frequent watery green stools, in which active *Giardia intestinalis* were found. Emetine subcutaneously ⅙ gr. on second and third days and ¼ gr. on fourth day was followed by only slight fall of temperature. There was no sign of formed stools. On fifth day 1 gr. stovarsol was given by mouth and emetine stopped. Twenty-four hours later, less frequent stools becoming formed, definite improvement in general condition and temperature normal. One grain stovarsol given in each of following three days, by end of which time motions faeculent and formed and no pains. Giardia still present in stools. Stovarsol given every other day for six days, at end of which time no Giardia found in (normal) stools. Stovarsol continued 1 gr. every third day for 14 days, at end of which time no Giardia found in stool, and still absent 28 days later.

The author notes DOBELL's statement that emetine has no effect whatsoever on *Giardia intestinalis* or any other " common intestinal flagellates," nor has methylene blue, as advocated by CASTELLANI. Salvarsan *per os* is said (BAVANT, CARR and CHANDLER) to have cured human cases and mice and rat cases (ROGERS, KOFOID, YAKIMOFF). But DOBELL finds cure in these cases inconclusive. [Apart from conclusive " cure," there is the obvious duty of clinical relief of symptoms, if possible, and as quickly as possible.]

H. M. H.

MALLIK (K. L. Basu). **A Case of Infection in an Infant with** *Giardia (Lamblia) intestinalis.*—*Indian Med. Gaz.* 1926. Sept. Vol. 61. No. 9. pp. 448–449. [1 ref.]

Hindu male baby, one year old, bottle fed from two months, delicate, and frequently subject to milk indigestion, was suddenly taken ill, with temperature 103·4° F., vomiting and diarrhoea. In spite of various remedies, condition worsened, until on the fifth day microscopical examination of mucus from stool revealed large numbers of Giardia, actively motile and encysted. Stovarsol 1 grain every four hours was given. There followed very rapid improvement and after a week's treatment no cysts were found in the stool.

H. M. H.

AGUILAR (Ricardo). **The Treatment of** ***Balantidium coli.***—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company. Boston, Mass.* 1925. pp. 246–248.

Pigs are the natural host of *Balantidium coli*, but it can thrive and produce lesions in the intestines of men and monkeys. The organism, first described by MALMSTEN in Stockholm in 1857, has been reported in the human being in many parts of both tropical and colder latitudes. Among 40 cases of balantidic infection in the Quirigua hospital, Guatemala, 34 were suffering from malaria, two from pneumonia, one from inguinal adenitis, one from furnuculosis, and two from severe uncinariasis. All but four of the 40 cases harboured one or all of the following helminths, uncinaria, trichocephalus, and ascaris. All suffered from diarrhoea—5 to 16 stools daily. The stools of 14 contained pus, or pus and blood, denoting ulceration of the bowel.

Balantidic infection is most prevalent at Quirigua in August, September and October, very few cases being reported in the other months. The rainy season—average rainfall 15 inches per month—is June, July, August and September. A feature common to all countries is that balantidic infection occurs among those closely associated with the handling of pigs or pork. Guatemala is no exception; there the pig is a common domestic animal.

The balantidium thrives in the liquid contents of the bowel; only encysted forms are found in the formed faeces.

The author believes that balantidium thrives best in people who are consuming excessive amounts of carbohydrates and insufficient quantities of protein foods and green vegetables.

*Treatment.* First—reduce the carbohydrate intake. Second—stovarsol is apparently "a specific." It should be given as a tablet (0·25 gramme) 2 or 3 times daily, after meals, for seven days. In all 40 cases, after five days' stovarsol treatment as above, the stools were negative for *Balantidium coli.* Many of these cases examined two months later were found to be still free of pus, blood, or *Balantidium coli.*

The author thinks it possible that chickens and birds may become hosts of *Balantidium coli.* He fed two canaries on lettuce contaminated with cyst-containing stools. Both developed diarrhoea—pus, blood, and *Balantidium coli* being found in the evacuations—and died within two days.

*Balantidium coli* is probably transmitted by means of faecal-contaminated water or green vegetables, as well as by mechanical means.

H. M. H.

HERMITTE (L. C. D.), SEN GUPTA (S. C.) & BISWAS (T. N.). **The Therapeutic Value of Stovarsol administered by Mouth in Parasitic Infections of the Bowel, with Special Reference to its Rapidly Curative Effect in Human Balantidiosis. (A Contribution from Assam.)**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. June 17. Vol. 20. No. 3. pp. 206–212. [19 refs.]

The authors have had good results from stovarsol in amoebic dysentery, lambliasis, and trichomonas infections, and in this interesting paper they report results of its use in four cases with mucosanguineous stools containing *Balantidium coli.* The cases are fully described. Léon Bernard and Thomas (1924) reported cure of one case of balantidiasis by stovarsol.

Case 1. Emetine, E.B.I., N.A.B. (by mouth), had no effect whatever. Death occurred before stovarsol was tried. Rectal injection of quinine (reported as effective in balantidiasis) was not tried.

Case 2. Balantidium and trichomonas disappeared after the third dose of stovarsol (12 grains in all) and a further 70 days of repeated stool examinations yielded neither of these parasites, even after saline purges.

Case 3. Balantidium disappeared after fourth day of treatment with stovarsol (16 grains in all) and daily examination of stool for 62 days yielded constantly negative results.

Case 4. Balantidium was not found again after third dose of stovarsol (12 grains in all) and was absent during the 11 days following and preceding this patient's death from broncho-pneumonia. (Lamblia disappeared for good after the second dose of stovarsol (8 grains in all).

Hitherto the therapy of balantidiasis has been difficult, but from these results the authors, not unreasonably, claim that in stovarsol one has an excellent remedy for balantidial enteritis. It is a safe drug, [death from arsenical dermatitis following its use is known], easy to administer (by mouth). It is a good general tonic and has a marked influence on the haemopoietic system. They are sure that with a wider use of the microscope in Assam hospitals, balantidiasis will be found to be much more common among coolies than hitherto known or believed.

H. M. H.

Devesa. [**Balantidium Dysentery in Spain.**]—*Arch. Esp. de Enf. del Aparato Digestivo.* Madrid. 1926. Apr. Vol. 9. p. 228. [Summarized in *Jl. Amer. Med. Assoc.* 1926. July 31. Vol. 87. No. 5. p. 367.]

Report of two cases, the first to be discovered in Spain. Both were cured by emetine and neoarsphenamine, aided by enemas of bismuth. Since Malmsten discovered the parasite in Stockholm in 1857, no infections in human beings have been recorded in England, and only five in France.

H. M. H.

Witherspoon (Jack). Report of a Case of Amebic Dysentery with Liver Abscess and Rupture into the Pleura.—*Southern Med. Jl.* 1926. Sept. Vol. 19. No. 9. pp. 673–675. With 3 text figs. [6 refs.]

# PLAGUE.

GAÏSKY (N.) & ALFIONOV (S.). Epidémie de peste pulmonaire à Baïkodam de la région sablonneuse de la steppe de Kirghiz. [**Epidemic of Pneumonic Plague in the Sandy Region of the Kirghiz Steppe.**]—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. French summary pp. 229–230. [In Russian pp. 133–136. 2 refs.]

The centre of this outbreak was 100 kilometres to the north of the Caspian Sea, at Baikodam. The epidemic lasted a month, from the middle of February to the middle of March, 1926. There were 28 cases of pneumonic plague, all fatal. In the first case, a Kirghiz woman, there was present a submaxillary bubo. In all the others, the infection spread by contact between families. It was considered that the original infection came from mice, as there was an epizootic among mice and gerbilles in the Baikodam region.

J. H. Tull Walsh.

STEPANOV (I. V.). **The Plague Outbreak in Kzil-Kuga Rayon, the Uralsk Government, in the Winter of 1925.**—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. English summary pp. 232–233. [In Russian pp. 147–151.]

This was an epidemic of pneumonic plague, north of the Caspian Sea, without buboes, even in the first case. The actual source of infection was not traced, but it was supposed to have come from contact with rodents. The outbreak lasted from November 16th to December 27th, 1925. Forty persons were attacked; all died. The author considers that this high mortality was due to lack of local medical organization. Anti-plague detachments arrived, after some delay, about December 10th.

J. H. T. W.

i. KLODNITZKI (N.). Voprosi Epidemiologii Astrachanskoi Chumi. [**Problems of Plague Epidemiology in Astrakhan.**]—*Guigiena & Epidemiologia.* Moscow. 1926. Vol. 5. No. 1. pp. 43–55. French summary p. 145. [11 refs.]

ii. GAISKI (N.). Chuma u Suslikov po Vremenam Goda. [**Plague in Susliks in relation to Season.**]— *Vjestnik Microbiologii & Epidemiologii.* 1926. Vol. 5. No. 1–2. pp. 3–19. French summary pp. 103–105. With 1 fig. & 6 diagrams. [14 refs.]

i & ii. While it is universally agreed that sisels (susliks) and mice (both domestic and wild) are directly responsible for the human plague outbreaks in South-east Russia, much controversy still exists as to the permanent reservoir of infection. As gathered from the discussions at the Saratov Anti-Plague Conferences, some observers have not emancipated themselves from the idea that the rodents might become periodically infected by gnawing buried corpses of human plague victims. More stress should be laid upon the contention of Klodnitzki that the small susliks (*Spermophilus musicus, mugosaricus,* etc.) are not the permanent carriers of plague but receive infection from the larger species. Klodnitzki (i) suspects now the *Cynomys fulvus* (black *spermophilus* or small prairie dog) to be the fountain-head of infection. However, the systematic studies of Nikanoroff (this *Bulletin*, Vol. 23, p. 184) and Gaiski (ii) leave little doubt that plague is perpetuated among the small susliks. Gaiski suggests, as a result of his experiments undertaken throughout a whole year, that the continuation of the disease among sisels without their dying out wholsesale is due, not as much to a gradually developing specific immunity, as to seasonal changes of susceptibility to infection.

Wu Lien Teh and R. P.

ii. From July 20th, 1924, to June 20th, 1925, the author experimentally infected 242 spermophiles with plague. Of these, 30 were inoculated during full hibernation. The conclusions drawn from the experiments are: (1) The susceptibility of spermophiles to plague varies according to the season, decreasing in winter, increasing in summer. In the bodies of hibernating animals *B. pestis* seems to lose virulence and is less easily cultivated; the type of plague may even be localized and atypical. Epizootics of plague generally begin after hibernation and the months of June and July are most dangerous on account of the large number of septicaemic forms.

J. H. T. W.

Wagner (J.) & Joff (I.). O Blochach Suslikov (i Tushkanchikov) v Sviazi s ich Roliu v Rasprostranenii Chumi v Privolshskich Stepiach. [**On the Fleas of Susliks (and Jerboas) and their Rôle in the Spread of Plague in the Volga Steppes.**]—*Vjestnik Microbiologii & Epidemiologii.* Saratov. 1926. Vol. 5. No. 1–2. pp. 57–100. German summary pp. 108–123. With 24 figs.

This exhaustive study contains a detailed description of the fleas found on the South-Russian sisels and jerboas. The following flea list may be given for three species known to suffer from natural plague:—

| *Citellus musicus*: | *Citellus mugosaricus*: | *Alactaga saliens*: |
|---|---|---|
| *Ceratophyllus tesquorum.* | *Cer. tesquorum.* | *Mesopsylla tuschkan.* |
| *Ctenophthalmus pollex.* | *Cten. pollex.* | *Ceratophyllus (Ophthalmopsylla) volgensis.* |
| *Neopsylla setosa.* | *Cten. breviatus.* | |
| | *Neopsylla setosa.* | |

Evidently the suslik fleas do not live constantly on their hosts, but dwell partly in the burrows; this holds apparently true of the species of *Neopsylla* and *Ctenophthalmus* which possess rudimentary eyes.

Investigations upon the flea rate at different seasons of the year are not complete, so far as the numbers found in the nests are concerned. The rate of fleas found on the rodents themselves seems to increase in the course of the summer.

The authors emphasize that only in rare cases the fleas of *Citellus musicus* were seen to pass over to the jerboas and *vice versa*; though both species live in close contact. [It is interesting to remember in this connexion that, according to Nikanoroff,* no plague transition from one species of South-Russian rodents to another has yet been observed under natural conditions] [*v.* this *Bulletin*, Vol. 23, p. 618 (Golov & Joff)].

Wu Lien Teh & R. P.

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* *Vj. Microbiol. & Epidemiol.* 1925. No. 3. p. 34.

SKORODUMOFF (A.). O Tarabaganei Chume v Zabaikalie. [**Tarabagan Plague in Transbaikalia.**]—*Mikrobiologicheski Jl.* 1925. pp. 210–212. [2 refs.]

——. Obsledovanie Chumnogo Ochaga Zabaikalia Letom 1925 Goda. [**Observations on the Transbaikalian Plague Area in Summer 1925.**] —*Guigiena & Epidemiologia.* Moscow. 1926. Vol. 5. No. 2. pp. 47–50. French summary p. 108. [1 ref.]

——. Ob Organizatsii Protivochumnogo Diela v Sibiri. [**Organization of Anti-Plague Work in Siberia.**]—*Trans. of the 1925 Saratov Anti-Plague Conference. Saratov. 1926.* pp. 230–237. German summary p. 286.

——. K Voprosu o Desinfektsii Tarabaganich Shkurok v Zabaikalii. [**On the Disinfection of Tarabagan Skins in Transbaikalia.**]—*Ibid.* pp. 237–243. German summary p. 287. [7 refs.]

Skorodumoff's observations on disinfection of marmot skins may be noted. He found the disinfecting chamber at Borzia, where the permanganate-formalin method was adopted, insufficient ; skins of plague-infected guineapigs were found to contain *B. pestis* after having been exposed in the chamber ; plague cultures, bed-bugs, fleas, lice and ticks were alive after exposure. Good results were obtained in the steam-formalin chamber at Kiachta if a temperature of 60° C. was maintained for one hour. At a temperature of 52–56° C. plague cultures were not killed in an hour, and positive results were obtained from the exposed skins of infected guinea-pigs and mice. The quality of the furs was apparently not impaired by the disinfection.

Wu Lien Teh & R. P.

LEGER (Marcel). La peste : rôle de l'homme dans la conservation du virus. [**Plague : the Rôle of Man in the Conservation of the Virus.**] —*Paris Méd.* 1926. June 5. 16th Year. No. 23. pp. 552–556. [24 refs.]

This paper gives further examples of cases of plague in which the author regards man as the source of infection. From numerous observations he concludes that man is liable, on the same level as rodents, to carry on and perpetuate plague infection. He states as one proof that three natives of Dakar were carriers of *B. pestis* without showing any signs of illness. They were kept under observation during about one month. Freed from isolation to ordinary life, they continued to enjoy perfect health [*v.* this *Bulletin,* Vol. 21, p. 878 (LEGER)].

J. H. T. W.

WILLIAMS (C. L.). **Modern Trends of Plague Epidemiologic Research.**—*Milit. Surgeon.* 1926. Aug. Vol. 59. No. 2. pp. 155–164. [12 refs.]

A good general account of modern lines of research in plague. The author writing of " resolving plague " in rodents records that, in New Orleans, two rats showing signs of resolving plague were discovered, in which pestis bacteraemia was demonstrated. Further, by inoculating a large number of rats with plague, it was shown that a few of them, after recovery from the acute infection, continued to harbour plague bacilli in the blood for as long as 30 days after the inoculation (longer periods were not tested). The proportion was small—four out of 890 rats, or ·45 per cent. This suggests important possibilities and some results will be published shortly in the *American Journal of Tropical Medicine.*

J. H. T. W.

BICKOV (S. G.). **On the Influence of Plague over the Sexual Sphere of Woman.**—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. English summary p. 236. With 3 figs. on 1 plate. [In Russian pp. 165–174. 15 refs.]

These notes on the pathology of plague as it affects the female sex organs come from the Clinic of Obstetrics, Saratov University. Pregnancy is stopped, and mother and foetus perish. There is haemorrhage into the serous layer of the uterus. Under the microscope the uterus shows hyperaemia and extravasations. In the blood vessels plague bacilli occur. During menstruation, clots of blood are found in the mucous membrane and the alterations in the muscular layers of the fallopian tubes are identical with those in the uterus. The plate shows sections of: (1) vascular layer of uterus; (2) submucous muscular layer of uterus; and (3) graafian follicles in the stage of degeneration.

J. H. T. W.

PASO (Juan Roberto). Los procesos neumónicos en la peste ganglionar. Estudio de la bronconeumonia pestosa secundaria (bronconeumonia bubónica). [**Secondary Broncho-pneumonia in Bubonic Plague.**]—*Semana Méd.* 1926. Aug. 26. Vol. 33. No. 34 (1702). pp. 505–525. With 9 text figs. & 2 charts.

Since 1900, when there was an epidemic of plague in Buenos Aires, numerous sporadic plague cases have occurred, showing that plague infection does not disappear with the ceasing of an epidemic. The author has opportunities for studying such cases in the Hospital for Infectious Diseases. He has investigated in particular the broncho-pneumonia occurring in cases of bubonic plague, its morbid anatomy and histology. Two fatal cases are described in great detail, and the text figures illustrate the condition of the lungs and the minute pathology disclosed by the microscope. The paper concludes with references to the work of other observers and a general review of secondary plague pneumonia.

J. H. T. W.

SHARP (N. A. Dyce). **A Note on the Treatment of Plague in Nigeria with "Bayer 205."**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Feb. 18. Vol. 19. No. 8. pp. 482–484. With 9 charts.

In Lagos during the last four months of 1924 over 150 cases of plague were admitted into the Infectious Diseases Hospital. Many arrived in a moribund condition. The death-rate was about 80 per cent. Methods of treatment included: intravenous injections of anti-plague serum in doses of 50 to 250 cc.; injections of a solution of iodine (twice as much iodine as in tinct. iodi mitis) in doses of 10 to 60 minims; injections of N.A.B. and of perchloride of mercury $\frac{1}{8}$ gr. to $\frac{1}{4}$ gr.; and also carbolic acid in 1 minim doses and salol 5 gr., by the mouth. Towards the end of the epidemic, owing to unsatisfactory results, injections of "Bayer 205" were tried. Altogether 12 cases were thus treated, and of these, three were in a hopeless condition when admitted. Of these 12, four died including the three moribund cases. The fourth case, an old woman of 80, failed to respond to any treatment. In the eight cases which recovered, fall of temperature and improvement in general conditions occurred. The author states that " Bayer 205 " in small doses is free from danger. He thinks that repeated small doses are of more benefit than one large one.

J. H. T. W.

BHARÀDWAJ (A. C.). **The Treatment of Bubonic Plague with Intravenous Injections of Iodine.**—*Indian Med. Gaz.* 1926. Feb. Vol. 61. No. 2. pp. 63–64.

The author uses a solution of 18 grains of iodine with 36 grains of iodide of potassium in 4 ounces of normal saline, and injects, intravenously, 5 to 10 cc. in one dose daily for four days. He has treated 100 cases with about 80 per cent. cures. Early cases do well, but serious cases in an advanced stage do not respond to this treatment. With this treatment he always gives the following mixture, every four hours :—

| | |
|---|---|
| Pot. iod. ... ... ... ... | gr. v |
| Sp. Ammon. Aromat. ... ... | m. xx |
| Tinct. Strophanthi ... ... | m. ii |
| Sp. Vini Gallici ... ... ... | drs. ii |
| Aqua ad ... ... ... ... | oz. i |

[*cf.* this *Bulletin,* Vol. 22, p. 378 (MARSHALL and other references)].

J. H. T. W.

GRIMES (C.). Du traitement de la peste bubonique par les injections intraveineuses d'iode colloidal. [**Treatment of Bubonic Plague with Colloidal Iodine.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 407–409.

Seven cases of bubonic plague were treated with intravenous injections of a preparation of colloidal iodine known as " Neo-Riodine." The doses varied between 30·0 cc. and 60·0 cc. in 24 hours, 10 cc. every 4 or 6 hours, until a normal temperature appeared. Six of the patients recovered ; one died, and in this case there was some suppression of urine, with disease of the kidneys.

J. H. T. W.

TURKHUD (D. A.). **The Treatment of Plague ; a New Suggestion.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. pp. 387–389. [5 refs.]

Having reviewed the treatment of plague with the anti-serum, tincture of iodine and plague " bacteriophage," the author introduces his new suggestion which is based on the following argument. The addition of 2 to 5 per cent. of sodium chloride to fresh bacterial cultures will produce " involution forms." Intravenous injections of salt solution, such as have proved harmless in man, should " not only help to relieve the congestion of the liver, spleen, and other internal organs, but, by flushing the kidneys and the intestines, also remove the toxins from the general circulation " and are " extremely likely " to have a specific action on the bacilli themselves.

The author suggests that this treatment might be carried out on the following lines: A stock solution, ready for use, of sodium chloride pure 150 grammes, distilled water 1,000 cc., sterilized either in an autoclave or by boiling; temperature of solution at time of injection 100° F. Of this solution, 50 to 100 cc. should be injected at a time with aseptic precautions. The injections might be given once or twice a day, according to the conditions of the case, strict watch being kept for the increase of bile pigments in the urine.

J. H. T. W.

INGRAM (A.) & PIRIE (J. H. Harvey). **Report on Bacteriological Research Work carried out in Connection with Plague during 1925.**—*S. African Med. Rec.* 1926. June 12. Vol. 24. No. 11. pp. 252–257.

Several aspects of the plague problem in South Africa have been investigated:—

1. *Comparative Susceptibility to Plague of Various Veld Animals.* Prior to this work, natural plague infection was recorded in:—

(1) Common (Lobengula) gerbille.
(2) Multimammate mouse.
(3) Striped mouse.
(4) Long-eared mouse.
(5) Ground squirrel
(6) Eastern Karroo rat.
(7) Spring hare.
(8) Yellow mongoose.

Every *rodent*, including the seven above mentioned, and several other species, has been found sensitive to infection, showing some difference in degree between different species; all the veld rodents appear more sensitive than the common black rat. "Our present knowledge" points to the following as of practical importance:—

(1). On the high veld.—The gerbille, multimammate mouse and the ground squirrel.

(2). On lower, more bushy country.—The striped mouse. The Karroo rats, important as regards number, and perhaps the most sensitive to experimental infection, appear to escape when an epizootic rages among gerbilles living close to them. The reason seems to be that the flea parasites differ from those of the gerbilles. For a similar reason the spring hare is not of much importance in spreading infection.

Two carnivores living in close relations with rodents, which they eat, have been observed dying in numbers in the wake of a plague epizootic. They are the suricat and the yellow mongoose. Experimentally, the suricat is easily infected with plague, by inoculation and by feeding; it has not been found possible to infect or kill a mongoose although enormous doses have been employed. This animal should be protected. The suricat probably plays little part in actually spreading the disease.

Nine strains of South African *B. pestis* (two from rodents, seven from human beings) have been compared with human strains and rat strains from Bombay and human strains from Ceylon (Japanese ship), Manchuria and Nairobi. All these strains had the microscopic and cultural characters of *B. pestis*. With some differences of virulence, all the strains gave the characteristic pathological picture of plague when suitable animals were infected either by inoculation or scarification. Agglutination tests were positive, but in varying degrees. Field experiments showed that plague could be spread among gerbilles by laying down infected food, and by letting loose infected animals. Dr. Pirie also reports what he believes to be a new disease in gerbilles, due to a bacillus belonging to the diphtheroid group. The entomological work was done by Dr. INGRAM. Four fleas have been added to the list of those known to occur on veld rodents. Breeding, longevity and feeding experiments were carried out. In the transmission experiments the method employed was that of the Indian Plague Commission. The fleas tested were: *Dinopsyllus lypusus* (J. & R.), *Chiastopsylla rossi* (Waterston), and *Xenopsylla eridos*. The two first both conveyed plague from infected to uninfected rodents. The single experiment with *X. eridos* produced no result, the number of fleas (20) being probably too small.

Further work is contemplated. J. H. T. W.

JETTMAR (H. M.). **Notes on the Vitality of Plague Bacilli in Stained Smears.**—*Nat. Med. Jl. China.* 1926. Feb. Vol. 12. No. 1. pp. 1–8. [13 refs.]

The vitality of *B. pestis* has been studied by drying on splintered glass or cover slips in sterile Petri dishes, at room temperature. As soon as the smears began to dry at the border, they were passed through the flame 5 or 6 times until completely dry. The stains employed were those used in routine work. The vitality of the bacilli was tested on 28 young, full-grown guineapigs; average weight 400–600 gm. A little normal saline was poured on the slide and the film scraped off with the edge of another slide. Half the emulsion was injected subcutaneously into a guineapig, the other half was soaked up in a swab and rubbed into the shaved abdominal skin of another guineapig. The results of the experiments are contained in the following table:—

RECORD OF FOURTEEN MALE GUINEAPIGS INOCULATED ON OCTOBER 24TH, WITH THE EMULSION OF SMEARS FROM THE INGUINAL BUBO.

| Guineapig. | | Dried at room temperature. | Passed through Flame. | Fixed by Alcohol. | Staining. | Mode of infection. | Result. |
|---|---|---|---|---|---|---|---|
| No. | Wt. | | | | | | |
| 3 | 490 g. | 1 hr. | — | — | — | Subc. | Died after 7½ days. Typ. Bub. Pl. |
| 4 | 520 g. | 1 hr. | — | — | — | Intrac. | Remained well. |
| 5 | 400 g. | 10 min. | — | 30 sec. | — | Subc. | ,, ,, |
| 6 | 500 g. | 10 ,, | — | 30 ,, | — | Intrac. | ,, ,, |
| 7 | 400 g. | 15 ,, | 7 times | — | — | Subc. | Died after 6 days. Typ. Bub. Pl. |
| 8 | 420 g. | 15 ,, | 7 ,, | — | — | Intrac. | Died after 8½ days. Typ. Bub. Pl. |
| 9 | 610 g. | 20 ,, | 6 ,, | — | Loeffler's Meth. | Subc. | Remained well. |
| 10 | 470 g. | 20 ,, | 6 ,, | — | ,, | Intrac. | ,, ,, |
| *11 | 550 g. | 25 ,, | 7 ,, | 30 sec. | ,, | Subc. | — |
| 12 | 500 g. | 25 ,, | 7 ,, | 30 ,, | ,, | Intrac. | Remained well. |
| 13 | 520 g. | 30 ,, | 7 ,, | — | 1 : 10 Car. fuchs. | Subc. | Died after 8½ days. Typ. Bub. Pl. |
| 14 | 550 g. | 30 ,, | 7 ,, | — | ,, | Intrac. | Remained well. |
| 15 | 550 g. | 35 ,, | 7 ,, | 30 sec. | ,, | Subc. | Died after 5½ days. Typ. Bub. Pl. |
| 16 | 540 g. | 35 ,, | 7 ,, | 30 ,, | ,, | Intrac. | Remained well. |

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* Succumbed to pneumonia on November 2nd; no plague bacilli were to be found in the organs.

The action of direct sunlight on a thin film of plague bacilli on glass is especially marked. Bubonic pus dried on cover slips for four hours did not contain any living bacilli (KITASATO). Pus from plague dried at 28°–30° C. contained living bacilli after two days; all dead after four days (KITASATO). Other workers' results are quoted. The German Plague Commission reported (1899) that after two days plague bacilli could no longer be cultivated from material dried on splintered glass.

J. H. T. W.

MARUYAMA (Y.). Ueber die Wirkung des Pestkoktantigens. [**Boiled Plague Bacilli as Antigen.**]—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1926. May. No. 254. German summary p. 1. [In Japanese.]

The antigenic power of bacteria may be increased by heating to boiling point for a definite time. On the strength of this finding, the author prepared a vaccine of plague bacilli so heated, and compared its action with that of a vaccine prepared in the ordinary way. The effects were different in rabbits and guineapigs, which showed how dangerous it may be to transfer, without further trial, results obtained in one animal to another, and especially to the case of man.

W. F. Harvey.

ZANZUCCHI (A.) & VERCELLANA (G.). A proposito della reazione delle termoprecipitine negli organi pestosi umani conservati. [**Results of Thermoprecipitin Test in Preserved Organs from Human Plague Cases.**]—*Pathologica.* 1926. Apr. 15. Vol. 18. No. 414. pp. 185–187.

Extracts of the liver preserved in formalin gave positive results, showing the presence of plague precipitinogen. Extracts of kidneys and intestine preserved in alcohol also gave positive results. But the same reaction was obtained with other organs (preserved in formalin 5 per cent.; alcohol 95°) which certainly had no connexion with plague.

J. H. T. W.

GRAHAM (J. D.). Enquête sur la peste pulmonaire dans l'Inde Britannique. [**Pulmonary Plague in British India.**]—*Bull. Office Internat. d'Hyg. Publique.* 1926. July. Vol. 18. No. 7. pp. 782–786.

This inquiry into pulmonary plague in India is an interesting report submitted to the "Comité de l'Office International d'Hygiène" at the October session, 1925. It contains nothing new.

J. H. T. W.

ADOLPHI (Hans). Ueber die Pestepidemie in der Mandschurei im Jahre 1910.—*Arch. f. Hyg.* 1926. Vol. 97. No. 1–2. pp. 1–11.

——. Das Steppenmurmeltier und die Pest.—*Deut. Med. Woch.* 1926. May 14. Vol. 52. No. 20. pp. 829–830.

LUSTIG (A.). La peste bubbonica, i ratti e le pulci.—*Policlinico.* Sez. Prat. 1926. May 10. Vol. 33. No. 19. pp. 649–650. [2 refs.]

MACARTHUR (W. P.). Generalized Eruption in Plague. [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Feb. 18. Vol. 19. No. 8. pp. 498–499.

PONS (R.). Procédé de diagnostic de la peste, post-mortem chez l'homme et chez les animaux.—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 405–407. [5 refs.]

RAYNAL (M. J.). Epidémie de peste bubonique de Diégo-Suarez (juin-octobre 1924) : dépistage *post-mortem* ; sérothérapie et vaccination.—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 592–604. [9 refs.]

SUWOROW (S. W.). Desinfektion- und Desinfektionversuche mit Chlor von Wohnräumen bei der Pest und Desinfektion der Sachen mit Schwefelkohlenstoff.—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. German summary p. 232. [In Russian pp. 143–145.]

TOURNIER (E.). La peste dans la province de l'Itasy.—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 410–415.

# CHOLERA.

ROGERS (Leonard). **The Conditions influencing the Incidence and Spread of Cholera in India.**—*Proc. Roy. Soc. Med.* (Section Epidemiol. & State Med.) 1926. July. Vol. 19. No. 9. pp. 59–91. With 14 text figs.

This is an interesting essay written with the author's usual care. The numerous charts and tables are of considerable value.

*Conclusions.*—" (1) In the 1817–19 and subsequent cholera epidemics in India, up to those from 1859 to 1871 described by Bryden and Cornish, the disease appears to have spread from its home in Lower Bengal over North-Western, Central and Southern India in a series of waves of two to four years' duration at somewhat irregular intervals, the endemic area, according to Bryden, being limited to Bengal and West Assam.

" (2) Since 1877 the monthly cholera mortality for every district in India has been recorded, furnishing far more detailed information than the army and gaol figures of Bryden's time; but they have not hitherto been utilized for a comprehensive study of the incidence and spread of cholera in India, such as is attempted in this paper.

" (3) A study of the average monthly cholera incidence and rainfall, temperature and humidity in a diagram and four maps of the seasonal incidence in forty-five divisions of India, shows: (*a*) No uniform relationship with rainfall, as the disease during the south-west monsoon is at its maximum in most parts of India, but at its minimum in Lower Bengal; but it shows (*b*) a regular great decline or disappearance of the disease in all parts of India when the absolute humidity falls to or below 0·400, such great dryness of the atmosphere preventing the epidemic prevalence of the disease. The months in which cholera first shows a great increase after the winter quiescent period in North-West and Central India are those in which the absolute humidity first rises to over 0·400, the seasonal increase in most parts of India being thus explained quite irrespectively of any spread from Bengal.

" (4) The average annual incidence of cholera is highest in Assam, Lower Bengal, Bihar and the eastern sub-Himalayan divisions of the United Provinces of Northern India, and in South-east Madras; all areas with few or no months in absolute humidity below 0·400, and consequent continued prevalence of the disease throughout the year.

" (5) The present endemic areas, as shown by the disease never having been absent for a single year in three recent decades, include the areas of high incidence, just mentioned, of Bengal, the United Provinces and Madras, together with the low-lying west coast of Bombay, with the constant absolute humidity of over 0·400, so the endemic areas are now far more extensive and scattered than the parts of Assam and Bengal indicated by Bryden as late as 1869.

" (6) The epidemic areas, in which severe outbreaks occur frequently after a year or two of complete absence of the disease, include the south and west of the United Provinces, all the Punjab, the Sind, Gujerat and Deccan divisions of Bombay, and the whole of the Central Provinces. The spread of epidemics in these areas has been studied by means of curves of the annual incidence in forty-five divisions for forty-five years, and in as many yearly maps of the distribution and months of the first annual increase, maximum prevalence and decline for each year.

" (7) A map showing the number of epidemic rises in each area, and those in which a rise occurred in the same years in contiguous areas, shows a larger number of epidemics in the United Provinces than in Lower Bengal, so they could not all have originated from Bryden's Bengal endemic area. The studies of the forty-five years' maps clearly show that a number of the increases originated in the endemic area of the United Provinces above described, from which they spread over the Punjab with decreasing intensity in proportion to the distance of the divisions from the United Provinces, and the dryness of their climate. Similarly, it is shown that the Central Provinces in recent decades were sometimes invaded from the east, from the southern Orissa divisions of Bengal, occasionally from the north, from the United Provinces, and frequently also from the west from the Deccan divisions, contrary to Bryden's conclusion that cholera always spreads from Bengal to the north-west over the United Provinces, or to the south-west over the Central Provinces to Bombay, with the monsoon winds. The facts on which he based his theory are now explained by the effect of low absolute humidity in inhibiting epidemics described in this paper.

"(8) The three most severe epidemics of modern times are considered in the light of the foregoing data, and in connexion with the meteorological conditions associated with them. The diffusion of the 1875–77 epidemic is mapped out and shown to have spread, largely through pilgrims, from separate endemic foci, north-west from Bengal and the United Provinces, east and south from Bombay, and north from Ceylon or Southern Madras. In each area of very high incidence the epidemic was associated with great deficiency of the previous rainfall, accompanied by drought, by bad water supplies, and often by famine. The epidemic of 1891–92 was spread mainly in the first year by a rarely occurring great Ganges pilgrimage, aided by deficient rains, and in the second year by continued deficient rainfall, and especially by the Hardwar pilgrims. The most severe epidemic of all, in 1900, was once more associated with very exceptional failure of both the monsoon and the succeeding winter rains over very large areas of India. A table is also given of the epidemic prevalence in every other of the forty-five years in which the total cholera mortality in India was much over the average. Out of twenty-five affected areas, in no less than twenty-four previous greater or less deficiency of the rains preceded the cholera exacerbations, and in the remaining area in the United Provinces in 1894 very exceptionally high humidity throughout the winter months was followed by a unique early recrudescence of the disease culminating in an epidemic.

"(9) By watching the climatic conditions influencing the seasonal and annual incidence of cholera in any area to which attention is now drawn, increased or epidemic prevalence should usually be foreseen in time to enable steps to be taken to lessen its spread by pilgrims and other travellers, by means of inoculating them against the disease before attending religious and other gatherings in cholera-infected districts. The Punjab, Sind, Gujerat and Deccan divisions of Bombay and the Central Provinces, so liable to invasion by epidemics, have largely in their own hands this simple means of lessening their cholera mortality. The sanitation, and especially the provision of a pure water supply, in all important pilgrim centres, should be a first charge on imperial and provincial revenues under reliable sanitary administration."

J. H. Tull Walsh.

Repper (E. N. D.). **An Epidemic of Cholera amongst Ballast Train Coolies in Bengal.**—*Jl. Trop. Med. & Hyg.* 1926. July 1. Vol. 29. No. 13. pp. 196–197.

The author describes a ballast train, consisting of 35 to 40 open trucks. The train moves along the lines carrying ballast, bricks, sleepers, etc. The workers, 160 to 180 coolies—male, female and children—live on the train ; many are born on the trains and live there all their lives. In March cholera attacked three ballast trains carrying, in all, over 500 coolies. The trains were taken to a suitable place for a cholera camp and segregated to prevent absconding and spread of the infection by the frightened coolies. Among 509 coolies there were 40 cases and 17 deaths, considered a satisfactory result when the great difficulties the staff had to contend with are taken into account. The infected refused to go into the cholera huts and were treated in the wagons. They gave trouble over taking medicine and intravenous injection of saline solution had to be abandoned as the patients and their friends created so much disturbance. Subcutaneous injection was managed in the majority of cases ; but only by holding the patient down and getting the solution in as quickly as possible. The epidemic subsided 48 hours after the trains were segregated in the camp.

J. H. T. W.

TOMB (J. Walker). **The Treatment of Cholera.**—*Lancet.* 1926. Oct. 2. pp. 721–722.

This letter contains a summary of various well-known methods of treating cholera in each of the stages of the disease. The author also alludes to the value of anti-cholera vaccination which conveys immunity lasting for several months. He concludes with a renewed recommendation of the " essential oils mixture "—*v.* this *Bulletin,* Vol. 23, p. 613 (YUI).

J. H. T. W.

PERUZZI (Mario). Fenomeni fermentativi e caratteri morfologici nella diagnosi dei vibrioni colerici e colerasimili. Ricerche sperimentali con una tavola di microfotografie. [**Some Fermentative and Morphological Characters of Cholera and Cholera-like Vibrios.**] —*Ann. di Med. Nav. e Colon.* 1926. July–Aug. Year 32. Vol. 2. No. 1–2. pp. 1–16. With 9 figs. on 1 plate. [15 refs.]

Section I describes methods recently described by CASTELLANI and others, of culture of organisms in symbiosis or close association. The author applies these to diagnostic differentiation. The types of association illustrated are :—

(1). Of one organism, producing only acid in a carbohydrate medium with one producing no acid, and giving both acid and gas.

(2). Of one organism producing both acid and gas in a carbohydrate medium, with one already grown some days, but not producing either, and giving a partial fermentation of acid without gas.

(3). Of one organism producing no gas in a carbohydrate medium, with another also producing no gas, and giving a fermentation with gas.

Differentiation of cholera-like organisms from cholera organisms by method (1) is usefully supplemented by method (3), a fact which is brought out in tables II and III.

Section II deals mainly with a new enrichment medium for the isolation of vibrios and for their morphological study. The technique of preparation and use is as follows :—

(1) Add to nutrient bouillon 10 per cent. sugar-free neutral gold label gelatin ; (2) Neutralize accurately ; (3) Heat together in a water bath, and boil for 10 min. : starch 1 gm. ; asparagin 1 gm. ; sod. chloride 1·5 gm. ; water 100 cc., with frequent shaking to obtain a homogeneous suspension ; (4) Add 10 cc. of the gelatin, 3 cc. 5 per cent. sod. carbonate and freshly prepared neutral solution of purified litmus to give the requisite colour ; (5) Distribute 10 cc. quantities in test tubes ; (6) Sterilize at 110° C. ;

(7) Sow one drop, test faecal suspension in 10 cc. medium; (8) Shake; (9) Incubate in the inclined position; (10) Examine microscopically after 7–8 hours incubation, or earlier; (11) Examine for acidification and pellicle formation; (12) Stain with carbol fuchsin or Giemsa and examine.

Section III deals with the polymorphism and structure of vibrios. The author concludes that cultural forms of cholera and cholera-like vibrios show: (1) differentiated chromatic bodies, presenting during division not only the appearances, but the behaviour of a nuclear apparatus; (2) the presence of sporiform bodies capable of development in linear form and branched symmetrically tripod forms with characters which suggest the affinity of vibrios to the *Fungi imperfecti* and particularly to the genus *Vibriothrix*.

W. F. Harvey.

BALTEANU (I.). **The Receptor Structure of** *Vibrio cholerae* (*V. comma*) **with Observations on Variations in Cholera and Cholera-like Organisms.**—*Jl. Path. & Bact.* 1926. July. Vol. 29. No. 3. pp. 251–277. With 6 figs. on 1 plate. [34 refs.]

The theory here investigated is given as follows: (1) The motile bacillus possesses two distinct kinds of agglutinable substances, one labile, the other stable when subjected to 100° C., or to dilute acids, or absolute alcohol; (2) The labile factor and its agglutinins are responsible for agglutination in large loose flocculi; the stable factor and its agglutinins are responsible for agglutination in small compact granules; (3) The isolated flagella react as if composed entirely of labile material; (4) The serum agglutinins for the labile antigen react in an inverse way and resist a temperature of 70° C. for 20 min.; those for the stable antigen are inactive after such treatment; (5) The non-motile races of normally flagellate organisms contain only stable antigen.

The stable agglutinins for the body substance of the organism are denominated " somatic " (" O ") agglutinins and those for the flagella, labile " H " agglutinins.

PART I. *Summary.*—(1) *V. cholerae*, like *B. proteus* and bacteria of the typhoid-paratyphoid group, contains stable " somatic " (" O "), and labile " flagellar " (" H ") antigens.

(2) The type of agglutination of these antigens is compact-granular and flocculent respectively, although the contrast between them is not so sharp in *V. cholerae*, which is only monoflagellate, as it is in the proteus aud typhoid-paratyphoid groups. If, however, the cholera organism suspension be composed of specially collected flagella, it agglutinates then in characteristic flocculi. Such a flagellar suspension induces in the rabbit the production of a serum which reacts almost exclusively with the flagellar labile constituents of an ordinary suspension of vibrios.

PART II. Is concerned with a search for variants among the vibrios, with special reference to changes in the receptor factors here investigated. The strains used (7 *V. cholerae*, 2 El Tor, 1 *V. paracholerae*) were examined for their general cultural, biochemical and serological properties.

*Summary.*—Three kinds of colony variants were obtained which were readily distinguishable from the smooth round uniform transparent normal colonies. Of these variants I and II reverted with subculture on agar and variant III (opaque) reverted, though slowly, to normal. The opaque variant III formed a tough pellicle on liquid media, was non-motile, stained rather badly, appeared normal except for the absence of flagellum, and was surrounded with a mucoid material which did not form a true capsule. It emulsified only with great difficulty, and that in distilled water ; it became slightly unstable with the addition of salt to 0·85 per cent. No heat-labile flagellar flocculating " H " agglutinable substance could be demonstrated in suspension, but the heat-stable somatic granulating " O " factor was well represented. Serum produced with this opaque variant, however, contained " H " or flagellar agglutinins, which showed that some " H " antigen remained. It made as efficient a receptor as the normal in complement fixation tests and appeared to have normal virulence for guineapigs. The action of anticholera serum for this opaque form, however, was less bactericidal than normal, and the acid agglutination optimum was found to be at a higher hydrogen-ion concentration.

W. F. H.

HIRSCH (Julius). Die anaerobe Züchtung des *Vibrio cholerae.* [**Anaerobic Culture of the Cholera Vibrio.**]—*Klin. Woch.* 1926. June 11. Vol. 5. No. 24. p. 1089. [3 refs.]

The cholera vibrio is generally classed as an obligate aerobe, and this is the case for ordinary methods of growth. In a protein-free medium, with asparagin as the only source of both carbon and nitrogen, chemical analysis of the metabolic products of cultivation show that the utilization of the asparagin is an *oxidation* process. But if glucose be added to such a medium, the utilization of the sugar is not an oxidation, but a *splitting* or *anoxybiotic* process. The formula for such a medium, which will give an equal amount of transformation of the sugar under both aerobic and anaerobic conditions, is : sod. chloride 0·5 ; pot. chloride 0·1 ; m/15 phosphate buffer solution (pH7·8) 20 ; calc. chloride 0·5 ; sod. asparaginate 0·89 ; glucose 0·9 ; water to 100.

It is easy to understand now, how the cholera vibrio can develop in the infected intestine under what are practically anaerobic conditions.

W. F. H.

HIRSCH (Julius). Zur Biochemie pathogener Erreger. Wachstum und Stoffwechselleistungen des *Vibrio cholerae* auf einfachen—chemisch definierten-Nährböden. [**Growth and Metabolic Products of** *V. cholerae* **in Simple, Chemically-defined Media.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1926. Sept. 11. Vol. 106. No. 3. pp. 433–467. With 1 text fig. & 7 charts. [Numerous refs.]

The author deals in this paper with the chemical decomposition effected by the *V. cholerae* when supplied with chemically-defined compounds as the sole source of supply of its necessary nitrogen and carbon food requirements. His media were exclusively fluid, containing pure mineral salts and of definite H-ion concentration, to which the organic compounds were added. He finds :—

1. *V. cholerae* can utilize l-aspartic acid as the sole nitrogen and carbon source of all its metabolic and energy requirements.
2. The decomposition of the l-aspartic acid by *V. cholerae* is of the nature of an oxidation process, having ammonia, acetic acid and carbonic acid as end products.
3. On a glucose-asparaginate medium *V. cholerae* forms ethyl alcohol in small quantity, formic, acetic and lactic acids.

W. F. H.

Popesco (Cornelia). Action préventive exercée vis-à-vis de la péritonite vibrionienne expérimentale par les plaquettes sanguines de lapins immunisés contre le vibrion cholérique. [**Prevention of Cholera Peritonitis by Blood Platelets of Immunized Rabbits.**]—*C. R. Soc. Biol.* 1926. July 9. Vol. 95. No. 24. pp. 420–421.

Blood platelets of rabbits immunized against *V. cholerae,* after thorough washing, are capable *in vitro* of powerfully agglutinating and lysing the vibrios to granules in presence of a little fresh normal serum. The blood platelets of normal rabbits under these conditions bring about agglutination but no lysis. The author now investigates their action *in vivo* :—

(1) Guineapigs inoculated intraperitoneally with two minimum lethal doses of vibrios mixed with blood platelets of an immunized rabbit all survive ; with three doses they succumb in the proportion of 50 per cent.

(2) Guineapigs inoculated with two minimum lethal doses, mixed blood platelets of the normal rabbit, succumb in the proportion of 64 per cent. ; with three doses they all succumb.

(3) Guineapigs inoculated at the same time as the above with a single minimum lethal dose of vibrios and no blood platelets all succumb.

W. F. H.

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Suzuki (Kiyoshi). Infectionsversuche mit Vibrio Kadikjöji. [**Infection Experiments with** *Vibrio kadikjö.*]—*Ach. f. Hyg.* 1926. Vol. 97. No. 3–4. pp. 141–161.

This paper deals at considerable length with the mode of infection in animals by *V. kadikjö,* a member of the much discussed El Tor vibrio group.

Some of the points which the author brings out are :—

1. The extraordinarily rapid passage of vibrios into the blood after intraperitoneal inoculation of guineapigs : this is a matter of only a few minutes.
2. The comparative ease with which infection is brought about in guineapigs after subcutaneous inoculation, with appearance of vibrios in blood, peritoneum, liver, spleen, bone marrow, kidney and large intestine, although not in stomach, small intestine or urine.
3. Inability to produce infection of guineapigs by feeding.
4. The high degree of toxic action shown in rabbits, but also in guineapigs.

The subject is largely treated from the point of view of the inclusion of this vibrio among the semiparasite organisms. " Semiparasite " organisms are characterized by their ability to give rise to successful infection with intraperitoneal, and their inability with other modes of injection. Their direct introduction into the blood stream can bring about toxaemia, but not commonly a septicaemia.

Subcutaneous inoculation is without result or at most is followed by a localized abscess. *V. kadikjö,* if it is to be called a semiparasite, differs then markedly from the majority in the ease with which infection is produced in the guineapig by subcutaneous and intracardiac injection. It may perhaps be considered then to stand especially high in the list of semiparasites.

W. F. H.

VERCELLANA (G.). La differenziazione del v. del colera dai colerasimili mediante un saggio di agglutinazione aspecifica. [**Non-specific Agglutination of Cholera and Cholera-like Organisms.**]—*Pathologica.* 1926. July 15. Vol. 18. No. 417. pp. 418–419.

The author with ZANZUCCHI had succeeded, by a non-specific acid agglutination test, in differentiating the closely allied organisms *B. melitensis* and *B. abortus* (Bang.). Could the test also serve to differentiate cholera from cholera-like vibrios? His results were: With lactic acid the cholera-like strains always agglutinated in large stable flocculi and very rapidly. Cholera vibrios, on the other hand, either do not agglutinate at all, as was the case for Plava and El Tor strains, or agglutinate slowly in small unstable flocculi and in lower dilution than the cholera-like strains.

W. F. H.

TOMB (J. W.). **The Prevention and Treatment of Cholera by Essential Oils.**—*Jl. Trop. Med. & Hyg.* 1926. July 15. Vol. 29. No. 14. pp. 210–212.

A further record of the treatment of cholera with the mixture of essential oils—see this *Bulletin*, Vol. 23, p. 613 (YUI) and reference to Tomb.

J. H. T. W.

ASCIONE (Guglielmo). Sull'azione patogena di un vibrione colerasimile nella cavia.—*Ann. d'Igiene.* 1926. Jan. Vol. 36. No. 1. pp. 1–23. With 5 text figs. [19 refs.]

HAHN (Martin) & HIRSCH (Julius). Gewinnung von Choleragift.—*Klin. Woch.* 1926. Aug. 20. Vol. 5. No. 34. p. 1569.

LEAGUE OF NATIONS. Health Organisation. A Memorandum on the Epidemiology of Cholera. [RUSSELL (A. J. H.)]—46 pp. [108 refs.] C.H. 339. 1925. July 31. Geneva. [*v.* this *Bulletin*, Vol. 22, p. 765.]

## ENTERIC FEVERS.

FREW (A.) & BUTT (H. T. H.). **Symposium on Enteric Fever. Manifestations Peculiar to Natives.**—*Med. Jl. S. Africa.* 1926. June. Vol. 21. No. 11. pp. 309–311.

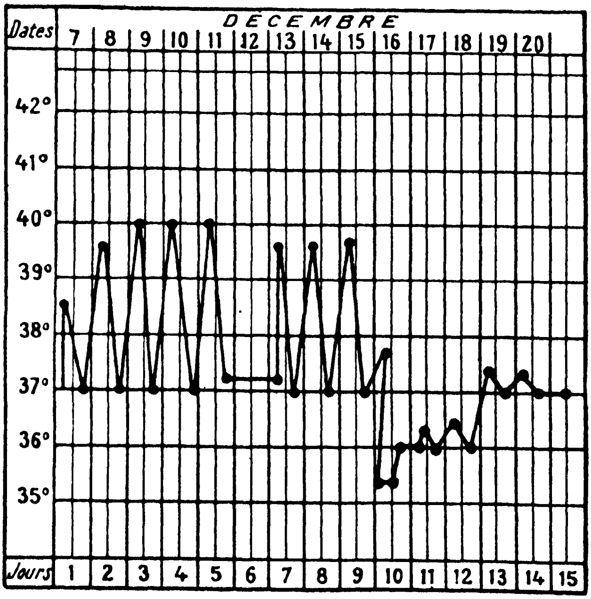
The title of this paper is somewhat misleading, as careful reading has not disclosed any " manifestation " that does not occur among other races and in other countries. The African native dislikes going into a hospital, so that frequently patients in an advanced and severe state are met with. One case is recorded of a native standing amongst a group of discharged boys awaiting his turn to be passed out to go home. One of the authors saw that the man had peritonitis and perforation. He was taken into hospital and died within 12 hours. Relapses are more common among natives than among whites from the difficulty in making a hungry native understand the dangers of dietary excesses, in which he is encouraged by well-meaning brothers with tins of sardines, etc.; partly, also, from the difficulty of keeping a convalescent native strictly in bed.

J. H. Tull Walsh.

i. UBAGO (M.). Typhoide du type inverse. [**Typhoid of Inverse Type.**] —*Rev. Méd. et Hyg. Trop.* 1926. Mar.–Apr. Vol. 18. No. 2. pp. 46–47. With 1 chart in text.

ii. ——. Para-typhoide " B." [**Paratyphoid " B ".**]—*Ibid.* pp. 47–48. With 1 chart in text.

i. The author describes from Nicaragua a case of the " inverse type " of typhoid fever in which the temperature was high in the morning,

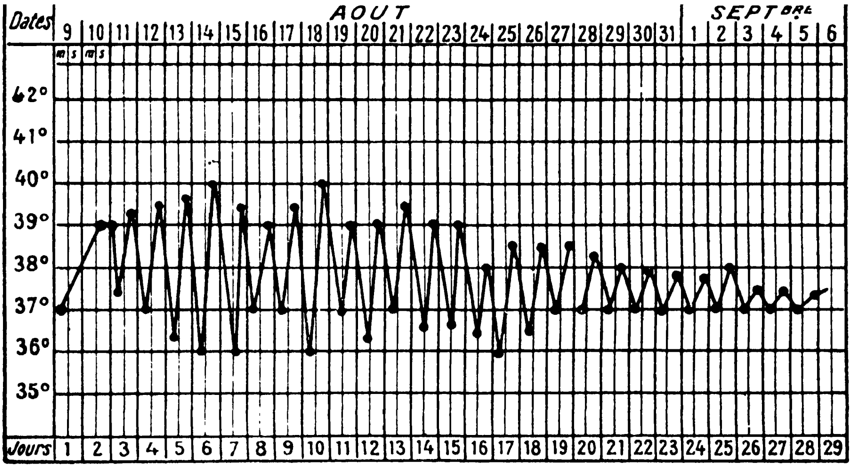


Temperature Chart of UBAGO's case of the "inverse type" of Typhoid Fever.

dropping to 37° C. in the evening for nine days and becoming subnormal during the remaining days. The remarkable chart is given below.

The patient, a man aged 40, was at first treated as a case of malaria ; but as quinine produced no effect, and in view of certain symptoms—headache, insomnia, foul tongue and stupor—the author considered whether it might not be a case of typhoid fever, and obtained a Widal reaction on the 9th day. On the 10th there occurred a marked haemorrhage from the intestines, with a fall of temperature to 35·5° C. The illness lasted 14 days and the man recovered.

ii. The case was that of a woman, aged 30, attacked with " fever " with high evening temperature, falling to normal or sub-normal, with shivering which seemed to imply malaria. She also suffered from headache, insomnia and irregular pulse. No plasmodia could be found in the blood and quinine made no impression. A haemoculture showed the presence of *B. paratyphosus* B. Treatment—iodized vaccine of Rendue and Senez, lacteol and adrenalin. The illness lasted 29 days and the patient recovered.



Temperature Chart of Ubago's case of Paratyphoid B.

J. H. T. W.

Münnich (G.). Die chirurgischen Komplikationen des Typhus abdominalis. [**Surgical Complications of Enteric Fever.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 208–217.

A paper read in October, 1925, before the German Society for Tropical Medicine, in Hamburg. These complications are noted in most text-books and need not be noticed in detail. Actual cases seen by the author are described. Out of nine operations for intestinal perforation there were four recoveries.

J. H. T. W.

SISON (Agerico B. M.) & IGNACIO (Modesta). **Coleman Diet in Typhoid Fever.**—*Jl. Philippine Islands Med. Assoc.* 1926. Mar. Vol. 6. No. 3. pp. 84–94. [5 refs.]

The authors discuss the Coleman high caloric diet for enteric fever cases. A table of the maximum and minimum of calories required according to symptoms for such a diet is given, also tables of the small meals given every two hours. These tables take up much space; but an idea may be given by quoting three forms of diet as given :—

| | | | |
|---|---|---|---|
| 1. | Milk | 100 cc. | 70 cal. |
| | Cream | 10 cc. | 20 ,, |
| | Lactose | 15 gm. | 60 ,, |
| 2. | Milk | 100 cc. | 70 cal. |
| | Sugar | 5 gm. | 20 ,, |
| 3. | Milk | 100 cc. | 70 cal. |
| | Cream | 10 cc. | 20 ,, |
| | Lactose | 15 gm. | 60 ,, |
| | Egg soft-boiled | 1 gm. | 75 ,, |

"The effect of the high caloric diet was tried in so few cases by us that well-grounded conclusions cannot be drawn." The authors, however, state their experiments prove that the feeding of a typhoid patient with high caloric diet does not produce any deleterious effect. Indeed they believe that the diet has a highly favourable influence on the course of the disease.

J. H. T. W.

DOMINGO (P.) & VIDAL (J.). La vacunación antitifica "per os." [**Antityphoid Vaccination by the Mouth.**]—*Rev. Méd. de Barcelona.* 1926. May. Year 3. Vol. 5. No. 29. pp. 465–468.

The first part of this paper gives a résumé of BESREDKA'S experiments and the results of administration of dysentery bacilli by mouth, with and without the previous use of bile, and of his finding that the immunity effected is a local tissue-immunity in the intestine.

The authors applied a modification of these results to the use of *B. coli*, by the following technique: Twenty-four hour cultures on agar were emulsified in as small a quantity of water as possible. This was treated with 10 times its volume of alcohol and ether, equal parts. Setting aside for 12 hours sufficed for sedimentation of the bacteria. The supernatant fluid was decanted off and the bacillary deposit subjected to the action of sterile neutral ox-bile. After 12 hours at 5° C. the emulsion was centrifuged, and the bacteria diluted with a mixture in equal parts of water, 90 per cent. alcohol, and glycerin, 1 cc. to each centigramme of the bacteria. Six guineapigs received each 1 cc. of the vaccine so prepared, four of the same weight being kept as controls. Five days after 20 m.l.d. of a virulent *B. coli* were injected intraperitoneally. All the controls died in 24 hours, whereas all those vaccinated survived.

A vaccine of Eberth's bacillus was then prepared in the same way as the above, and six guineapigs were given three doses of 1 cc., four guineapigs being used for control. Ten days after the last dose, 1 [supposed] m.l.d. was injected intraperitoneally. In 48 hours the group of vaccinated animals were perfectly well with normal stools and temperature. The controls exhibited a rise of temperature with diarrhoea, but had completely recovered in 15 days. The experiment was repeated, but with 20 times the former infecting dose. All the controls died within 48 hours, the others presented no ill-effects. These results are in course of application to man and will be the subject of a future report.

H. Harold Scott.

CORNWALL (J. W.). **On the Variation in Amount of Soluble Protein contained in Old Broth Cultures of** *B. typhosus.—Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 483–490. With 3 charts in text.

This is an investigation into the variation in the quantity of soluble proteins and of compounds capable of being precipitated by lead acetate from culture, with lengthening incubation. The maximum is reached after 7 to 12 weeks and then falls. With diminution of the concentration of nutriment the generation time lengthens and reproduction is slowed down. The conclusions are drawn that : " The rise in the soluble protein curve indicates that a larger amount of protein derived from solution of bacterial bodies is being added to the fluid than is being abstracted by degradation of protein. The fall in the soluble protein curve indicates that degradation of protein by hydrolysis is proceeding more rapidly than protein is being added by solution of bacterial bodies."

W. F. Harvey.

CORNWALL (J. W.) & BEER (W. A.). **On the Persistence of** *B. typhosus* **in Rabbits after Intravenous Injection.**—*Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 491–492.

Most rabbits which survive the injection free themselves from the bacilli entirely, but in some they may persist for several years, although the animal maintains good health. The chronic infection, however, may be contributory to the ultimate death of the rabbit. No indication of that infection is afforded by the agglutination titre of the serum. The history of three rabbits which were the subjects of chronic infection is given. Nos. 1 and 2 died of salmonella and bronchopneumonia infections respectively, and No. 3 was killed while still healthy. In each case the typhoid bacillus was recovered from the gall bladder and from the upper intestine or liver. These rabbits, as chronic carriers, appeared to differ from man, in that attempts to recover typhoid bacilli from the faeces were unsuccessful.

W. F. H.

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CALAZANS (Sebastião). Considerações sobre a febre typhoide em S Paulo.—*Bol. Soc. Med. e Cirurg. de S. Paulo.* Brazil. 1925. Mar., Apr., May & June. Ser. 3a. Vol. 8. Nos. 1, 2, 3 & 4. pp. 83–84.

——. A febre typhoide em S. Paulo.—*Ann. Paulist. Med. e Cirurg.* 1925. Aug. Year 13. Vol. 16. No. 8. pp. 51–71. With 2 charts in text.

CHAND (Wazir) ; HUNTER (R. N.). Four Suggestive Cases of Enteric Fever.—*Kenya Med. Jl.* 1926. Aug. Vol. 3. No. 5. pp. 146–148.

DUKE (H. Lyndhurst). Observations on the Occurrence of Enteric Fever in Natives of the Uganda Protectorate.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1925. June 18. Vol. 19. No. 3. pp. 178–179. [1 ref.]

FISCHER (Otto). Eine Schiffsepidemie von Typhus abdominalis.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Oct. 15. Vol. 29. No. 10. pp. 564–572. With 6 charts in text.

NICHOLLS (Lucius) & BURGESS (Edwin). *Bacillus typhosus* morphologically compared with Certain Bacilli present in Natural Waters.—*Ceylon Jl. Sci.* (Section D. Med. Sci.). 1925. Apr. 27. Vol. 1. Pt. 2. pp. 47–56. With 10 plates.

## MISCELLANEOUS.

INDIAN MEDICAL GAZETTE. 1926. Mar. Supplement. 48 pp. **The Indian Medical Year, 1925.**

In the compilation of this critical résumé of multifarious medical achievement in India during 1925 the author acknowledges the assistance of some specialists particularly distinguished in certain subjects. To review a Review of a field that has already to a considerable extent been scrutinized in this *Bulletin* would surely be wasteful and ridiculous excess, but profit may accrue from a survey of its scope, of its merits of method, and of its instructive incidental commentary.

Its scope, which is comprehensive, is a revelation of Indian enterprise and successful performance in many important branches of medical research, and the results are marshalled with admirable convenience and conciseness. Subjects are arranged in ten distinct sections, namely: (1) Diseases of the Tropics, their epidemiology, transmission, clinical aspects, treatment, etc.; (2) Surgery in the Tropics; (3) Hygiene and Public Health ; (4) Obstetrics, Gynaecology, and Infant Welfare; (5) Ophthalmology; (6) Medical Entomology; (7) Tropical Dermatology; (8) Pathology, Laboratory Methods, Serology, etc.; (9) Medicolegal Notes; (10) Service Notes. In addition there is a "special article" by Major GREEN-ARMYTAGE on recent advances in Obstetrics and Gynaecology, which takes the history far beyond India. In the three larger sections—Tropical Disease, Surgery in the Tropics, and Hygiene and Public Health—each specific disease and each aspect and venue of the subject are dealt with in distinct sub-sections. The section on *Tropical Diseases*, which forms more than three-eighths of the whole Review, consists of 18 sub-sections, including Medical Helminthology, Snake-bite, and Pharmacology. Comment is made (*a*) in the Dysentery sub-section, upon the fact that although five-sixths or more of the dysentery of India is bacillar, all the antiserum required in treatment is imported from abroad; (*b*) in the Malaria sub-section, upon the insufficient equipment of the Central Malaria Bureau; (*c*) in the Cholera sub-section, upon the indifference with which the world appears to regard the evidence pointing to the Bengal delta as its chief nidus of the disease; (*d*) in the Leprosy sub-section, upon a prevalent professional ignorance of the early symptoms and diagnosis of the disease; and (*e*) in the Pulmonary Tuberculosis section, upon the lamentable absence of any sign in India of a real attempt to grapple with this awful problem. The section on *Surgery in the Tropics* deals severally with Intestinal Surgery, Surgical Tuberculosis, Calculus and Vesical Surgery, Orthopaedic Surgery, Anaesthetics, Antiseptics, and Venereal Diseases and Framboesia; it also contains miscellaneous notes which include, among other things, the surgery of the ancient Hindus. One of the noteworthy features of the section on *Hygiene and Public Health* is a brief summary of India's new relations to international hygiene.

The chief author of this valuable Review regrets that it is not also a complete bibliographical record. Its price, however, is but one rupee (1s. 6d.) and one does not expect to get 100 oxen for the market price of 9 (*ἑκατόμβοἰ ἐννεαβόιων*)

A. Alcock.

Row (R.). **On the Present Position of the Medical Profession and Medical Research in India.**—*Indian Med. Rec.* 1926. Feb. Vol. 46. No. 2. pp. 33–38.

Dealing with the present position of the medical profession in India, the speaker deplored its heterogeneity and heteronomy and lack of cohesion, and consequently its impotence against a general public and governments that—with a few exceptions—are indifferent to the scientific aspects of medicine. As a glaring instance of official indifference, he mentions the abortion—due to the failure of the Bombay Government at the critical moment to supplement private munificence—of the Bombay School of Tropical Medicine.

Speaking of medical research in India he refers to the " five or six Government Research Institutes scattered over the country," but appears to forget the Calcutta School of Tropical Medicine. These Research Institutes, at present very efficiently managed by the Indian Medical Service, must soon suffer from the fact that that service has become unpopular among the higher ranks of the profession. The same argument applies to the Medical Colleges and to the administration of the Indian Medical Research Fund. The prospect, in short, is bad, both for medical education and medical research in India. A gleam of hope is apparent to the speaker in the scholarships of the Rockefeller Foundation and in the blessed word " re-organization "—applied to the Medical Colleges, and in a possible revival of the missionary spirit of " Sacrifice and Service."

A. A.

Reed (Alfred C.). **The Teaching of Tropical Medicine.**—*Jl. Amer. Med. Assoc.* 1926. Aug. 21. Vol. 87. No. 8. pp. 548–549.

A reasoned plea for the teaching of tropical medicine to all medical students in the United States. At Stanford University, San Francisco, there is a course of 22 hours in the department of public health and preventive medicine, supplemented by a laboratory course of the same duration.

A. G. B.

Manson-Bahr (Philip). **Research on Clinical Medicine in Tropical Disease.**—*Jl. Roy. Army Med. Corps.* 1926. June. Vol. 46. No. 6. pp. 442–444.

In this brief article, which forms one of a " Correspondence Circle," Dr. Manson-Bahr writes on protein shock therapy and the treatment of colitis. He has been much impressed with the possibilities of protein shock treatment as applied to the more chronic forms of tropical disease. He employs intravenous injection of a diluted solution of army typhoid-paratyphoid vaccine : the dose, 100 million organisms, is obtained by a 25-fold dilution of the vaccine. The second or third dose must be two or three times this strength. The only tropical disease discussed is climatic bubo, in which the treatment is specific. " It cuts short the process of suppuration and subsidence of the glands takes place almost instantaneously and, in short, the treatment is terminated within a week, whereas formerly the case lingered on for six weeks, two months, or more." Other cases treated with success are, obscure and fugitive forms of arthritis, arthritis and urticaria and, combined with specific treatment, obstinate tertiary syphilitic lesions. The shock produces high temperature and a leucocytosis.

The second part deals with yatren. This drug, which he finds most efficacious in early infections, he continues to use in amoebic dysentery. In chronic cases, with passage of cysts, he combines the intrarectal injection of 200 cc. of yatren, to be retained as long as possible, with E.B.I. in 3 gr. doses by the mouth; the injection is preceded by thorough lavage with 2 per cent. sodium bicarbonate solution. A ten days' course is usually sufficient. In three cases of acute bacillary dysentery (Shiga) an almost instantaneous improvement occurred after injection of yatren. In mucous colitis also the drug is of value and its use was followed by healing of the ulcers and general improvement in one case of ulcerative colitis.

A. G. B.

KHARTOUM. **The Kitchener School of Medicine, First Report 1924-1925.** [ATKEY (O. F. H.), Director, Sudan Med. Service, President School Council.]—50 pp. With 4 plates & 1 plan.

In a previous number of this *Bulletin* (Vol. 21, p. 309) an outline of the proposed Kitchener Memorial Medical School was sketched. We have here the first report, which contains a historical note and the inaugural address by Sir Lee STACK, with details of the aims, the buildings and administration of the School accompanied by suitable illustrations.

A subscription list was opened in 1916, and £13,000 was raised, all but £2,000 by natives of the Sudan. In May, 1922, building operations commenced, and the school was opened in February, 1924. It is estimated that for annual maintenance a sum of £3,000–£4,000 will be needed or an Endowment Fund of £70,000. The three main objects are: (1) to build up a staff of Sudanese doctors to work under the direction of highly trained British doctors; (2) to associate the educated natives of the Sudan in the development of their country; (3) to provide post-graduate courses for doctors trained at the School. The medical curriculum will at first occupy four years, to be followed by a year spent at a larger hospital; later, another year will be added. The post-graduate classes will be established about 1935.

The organizers realize the vital importance of systematic campaigns against the endemic diseases which are crippling the health and efficiency of the people and interfering with their natural increase; for this a greatly increased staff of doctors is needed. At present, in addition to the senior posts (British doctors), there are 73 junior posts held by Syrian doctors and 33 subordinate posts held by Sudanese assistant medical officers, empirically trained. Both these classes will be replaced by Sudanese doctors. It is proposed to pass out six doctors a year, from January, 1928, a conservative start.

The buildings are described with plan and elevation. The students are drawn from the final year students of the Gordon College. The report of the first year shows that ten students were admitted, and nine reached the required standard in the examination at the end of the year (physics, chemistry and biology).

The Report contains a syllabus of lectures and a list of subscribers; it is anticipated that £6,000 will be needed in 1927.

A. G. B.

Olivier (J.). Service médical du Ruanda-Urundi. (Territoire à mandat.) Rapport annuel pour 1924. [**Annual Report of Ruanda-Urundi Medical Service.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. July. Vol. 6. No. 2. pp. 115–144.

The author gives notes about the diseases met with in Ruanda-Urundi in the year under review. Sores and phagedenic ulcers are very common in the natives and very difficult to cure, which is attributed to the bad general state of the population and the frequency of syphilis and yaws. While broncho-pulmonary affections are mild and comparatively infrequent, intestinal affections are severe—amoebic dysentery, ancylostomiasis, flagellate dysentery, bilharziasis—and chiefly in the Usumbura plain. Here 92 deaths out of 199 were due to these causes in the order given, 52 being due to amoebic dysentery [it is not stated whether this diagnosis was supported by the microscope]; they are often present in association. Organic affections of the heart are fairly common and are attributed to syphilis and alcoholism, which is general. Of leprosy, 124 cases were recognized, half in Usumbura. Sleeping sickness is considered elsewhere [this *Bulletin*, Vol. 23, p. 898]. There is little information about malaria, but it is stated to be resistant and deadly; five deaths occurred in hospital among 44 patients. Relapsing fever is fairly common but seldom fatal; convalescence is often very long. Smallpox was not seen, but "a few cases of varioloid." A campaign against it was started in 1921, and in 1924 100,000 natives were vaccinated. Yaws is the chief endemic disease, particularly in Urundi. The author regards yaws as a disease which leads to the degeneration and enfeeblement of the race; 15,610 curative injections were given in the year 1924.

Under the heading special hygienic situation of certain groupings, the author considers in turn troops, labourers and prisoners. Among 635 soldiers and their wives and children, a community of about 1,100, there were 5,217 cases of illness, a high figure. The chief causes were wounds and ulcers, pulmonary affections (mild), and intestinal affections, from which one in every 22 suffered. There were 59 cases of bilharziasis [presumably all rectal] in Usumbura among an effective of 468; this high percentage is attributed to a bathing pool supplied from an infected river; the pool has been condemned. Other diseases from which the troops suffered were venereal, seasonal conjunctivitis, malaria, relapsing fever; 1 in 11 suffered from the two last named. A tabular statement is given.

Figures for native labourers show that the intestinal affections, ancylostomiasis, amoebic and flagellate dysentery, and bilharziasis are the chief causes of morbidity and mortality, and that among approximately equal numbers these diseases were about half as prevalent as among the troops. This is attributed to the facts that the soldiers at Usumbura are camped near an infected river and that the labourer is a countryman, whereas the soldiers come from all parts of the Congo.

The prisoners furnish the highest percentage of disease. Their conditions of dietary and work are not inferior to those of the troops and labourers, they are satisfactorily housed and cloth is served out for garments, but the lack of liberty leads to mental depression which impairs their resistance. Moreover, the native of this part of Africa is not used to regular work, and is accustomed to fermented liquors, which form a part of his nourishment and of which he is deprived in prison. A tabular statement shows that among 232 cases of disease occurring at two prisons there were 75 deaths (influenza, 27; broncho-pulmonary affections, 22; "misère physiologique," 7; intestinal affections, 6; etc.). The details of the ration are given [but it is not stated whether the prisoners could supplement it, as men of the other categories doubtless could].

A. G. B.

LE BOURGO. Notes médicales recueillies pendant la campagne de la "Bellatrix" dans l'Océan Indien (1923–1925). **[Medical Notes made during the Voyage of the "Bellatrix" in the Indian Ocean.]**—*Arch. Méd. et Pharm. Nav.* 1926. July–Sept. Vol. 116. No. 3. pp. 197–209. [1 ref.]

A few points of interest may be mentioned. The despatch boat "Bellatrix" called at some of the islands of the Comoro archipelago. At Mayotte there has been a hospital since 1851. Here Dr. KÉRÉBEL has been working on leprosy. In the Comoros and in Madagascar there a dermatomycosis recalling pityriasis, and designated by the Malagasies "Hody potsy"; it consists of patches found chiefly on the face and neck, and has been described by FONTOYNONT (this *Bulletin*, Vol. 20, p. 279). KÉRÉBEL believes that it goes on to tropho-neurotic mutilations and is then confused with leprosy. Of 314 interned persons, he believes 191 to be lepers, 75 to be certainly the victims of this mycosis, and 48 doubtfully so. The distinction is based on clinical data. In Mayotte, as in the other islands, malaria is endemic; filariasis with manifestations in the scrotum and lower limbs is seen and tropical ulcers. Yaws is widespread; family epidemics are not unusual. Gonorrhoea owes its diffusion to the strongly held belief that rapid cure follows sexual relations with a woman of very black skin. Great Comoro also is invaded by malaria, which was quite unknown at the time of the French occupation (? 1886); the medical service is carried on by Hovas, pupils of the Tananarive medical school. Malaria is severe in Réunion. Here are hydromineral stations which are described. The "Bellatrix" called also at Lorenzo Marques, where we learn that a hospital is being built which will contain 1,200 beds, at Mombasa, where smallpox was prevalent, and at Jeddah. The paper opens with remarks on plague in Madagascar.

A. G. B.

WESTPHAL (Carl). Beiträge zur Medizin der kolumbianischen Westküste. **[Medicine on the West Coast of Colombia.]**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 226–232. [1 ref.]

A sketch of the diseases met with in the south-west corner of the republic of Colombia, the State of Tumaco, in which the author practised for five years. It is a hot, damp land with abundant rain and an average temperature of 27° C., inhabited chiefly by negroes and cross-breeds who live on the coast and along the rivers; away from water is impenetrable marsh forest. *Malaria* abounds and makes it impossible for colonists to settle on the land. Malarial cachexia does not occur and the author has seen only four cases of blackwater. *Yaws* is almost as common, and occurs chiefly in childhood. Judging from the account, all the manifestations described in other countries are seen here. Loss of fingers and toes and deformities are common, and the author says that early in his career he reported a case to the authorities as leprosy which he later realized to have been one of yaws. Gangosa is not uncommon and is regarded as yaws. *Syphilis* occurs on the coast and is mild; in the uplands where yaws is not seen syphilis is severe.

Compared with malaria and yaws, other diseases have little importance. *Relapsing fever* is present, but is often regarded as malaria; in the author's own practice cases of fever which did not respond to quinine yielded to neosalvarsan. Notwithstanding the primitive character of the hygiene, *enteric fevers* are unimportant. Though the mosquito carrier is found, yellow fever is not observed. *Dysentery* is always present and liver abscess not infrequently. Intestinal worms do not produce symptoms of importance. The skin affection known as *Mazamorra* is frequent, but has no connexion, as is stated in text books, with ancylostomiasis; the author has himself had it. It affects the boot-wearers, seldom the barefoot natives, and is readily cured by application of silver nitrate solution. Leprosy is never seen on this coast.

A. G. B.

VIANNA (Luiz). Nosologia da zona norte do Estado do Ceará. [**Disease in the Northern Districts of Ceará.**]—*Arch. Brasileiros de Med.* 1926. June. Vol. 16. No. 6. pp. 275–276.

Syphilis is very rife. In 1923, of 1,500 school-children examined 70 per cent. showed signs of hereditary syphilis. Miscarriages also are very frequent. As regards yaws, the author mentions one place in the Ibyapaba Hills where practically every one is infected, but in Northern Ceará it is quite rare.

Helminthic infestations are found in at least 70 per cent. of the agricultural labourers. [The nature of the infections is not stated.] Malaria is widespread, especially at the end of the cold months, but this year in the district of Granja it has been troublesome through the cold weather also. Leprosy is uncommon in Ceará itself, but Sobral and Acarahú are endemic foci. Paratyphoid fever is frequent in the northern part of the State, and in 1919–20 there were definite epidemics. Tuberculosis is comparatively rare, except in the town of Granja, where there are many cases. The author questions whether yellow fever exists in the district now. Aëdes is present and there are large numbers of young children dying from "gastro-enteritis" in epidemic form. These are the two bases for the idea that yellow fever prevails, but there is no proof that the gastro-enteritis is due to yellow fever, nor that there is any connexion between the prevalence of this and the existence of *Aëdes argenteus.*

H. Harold Scott.

NÚÑEZ (Solón). **The Occurrence and Non-Occurrence of Certain Diseases in Costa Rica.**—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 347–356.

The information is sketchy, and little idea can be got of the relative prevalence of the diseases named.

Enteric fevers have decreased with hygienic precautions and a free vaccination service. There are other forms of paratyphoid beside A and B. The agglutination reaction has not the same diagnostic value as in other countries and haemoculture is advised. Of leprosy there are 100 known cases. Tuberculosis is mild ; a sanatorium exists with provision for 150 patients. In two instances the organism of undulant fever has been isolated. For smallpox vaccination is obligatory ; the last epidemic occurred in 1899 ; two cases of " alastrim " were seen last year. Of scarlet fever there were in 1920 40 cases. Measles is prevalent at intervals ; in the last epidemic the most frequent complications were intestinal. Malaria is endemic over two-thirds of the country, and not only on the coast ; subtertian is the most prevalent form. The mortality from amoebiasis in the last ten years is given as 2,552 persons or 2 per cent. of the whole mortality. Yaws is believed to occur. Some cases of tropical ulcer have been shown to be leishmaniasis. The information about metazoan diseases is vague. Practically all children over a year are said to harbour ascaris, and adults uninfected with trichuris are rare. Half the population have ancylostomiasis ; in 300 specimens Necator only was found.

The diseases noted as absent are : typhus, cholera. plague, rabies, yellow fever, relapsing fever and trypanosomiasis, but of the last it is stated that *Triatoma megista* is common and bites man, and that it harbours *T. cruzi.*

A. G. B.

NICOLLE (Charles). Rapport sur une mission scientifique en Argentine. [**Report on a Scientific Mission to the Argentine.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 166–172.

A brief report of two months spent in the Argentine Republic on the invitation of the President of the National Department of Hygiene. The author was able to take from Tunis the virus of typhus in guineapigs and that of kala azar in dogs for study and maintenance in the Argentine laboratories. The scientific results of the mission will appear later.

A. G. B.

MÜHLENS (Peter). Beiträge zur Pathologie von Südamerika. [**The Pathology of South America.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 143–160. With 17 text figs.

This " preliminary communication " goes over the same ground as a paper published in the Proceedings of the Conference of the United Fruit Company [this *Bulletin,* Vol. 22, p. 620]. Some good photographs are added. A detailed report of the expedition will be issued shortly.

A. G. B.

NILES (George M.). **Afro-American Therapeutics.**—*New Orleans Med. & Surg. Jl.* 1926. May. Vol. 78. No. 11. pp. 747–749.

The author writes from Atlanta, Georgia, after 35 years of practice in the South, and his conclusions apply to " quadroons and those of darker hue." He finds that for the Afro-American the dose of a cathartic is 50 per cent. greater than for the Caucasian. The same applies to emetics, but if the action required is on the vomiting centre less is needed ; e.g., 25 per cent. less apomorphia. The negro requires some 30 per cent. less anodyne for the relief of pain, and less sedative, such as bromide and trional. Counter-irritants, however, must be applied to the negro in considerable strength to produce results.

As a result of the study of 128 cases in which the stomach was unaffected and a test meal was given the author believes that " the normal free hydrochloric acid in the Afro-American exceeds that in the Caucasian stomach by at least 6—probably 10 per cent."

A. G. B.

AMERICAN MISSION HOSPITAL, Petchaburi, Siam. **Annual Report 1925-1926.** [NEDERGAARD (Niels).]—15 pp. [No Printer or Publisher.]

A recent report from this hospital was noticed in Vol. 23, p. 212. The number admitted as in-patients during the year under report was 216, as out-patients 1,096 ; 1,734 laboratory examinations were made, of which 869 concerned the blood and 486 the faeces. Ancylostomes were detected in 80 cases, ascaris in 49, trichocephalus in 41.

Institutions under native direction are now doing similar work and it is proposed that the hospital service be diverted to health service, which is defined as obstetric work in the homes, instruction in care of home and children, instruction given on tour in the prevention of disease and the treatment of minor ills, advice to " local medical people " in diagnosis and treatment.

A. G. B.

IKEDA (Kano). **The Blood in Smallpox during a Recent Epidemic.**—*Arch. Intern. Med.* 1926. May 15. Vol. 37. No. 5. pp. 660-673. With 5 text figs. [7 refs.]

Of 480 cases admitted to the Minneapolis General Hospital, including 191 discrete pustular cases, 110 confluent pustular, 131 haemorrhagic pustular and 48 purpuric, the author examined the blood at different stages in " approximately 200 " [how many of each is not stated]. The difference between the blood findings of the frank pustular forms and the purpuric form were " strikingly constant," and are shown in a series of curves. The summary and conclusions seem of sufficient importance to be given in full. The author refers to HOFFMANN'S work [this *Bulletin*, Vol. 21, pp. 332-3] and suggests that the eosinophilia recorded by him was due to prevalence of intestinal parasites, or a peculiar tissue reaction of the natives of Cuba to the smallpox virus.

Summary.—" An analysis of approximately 250 examinations of the blood in all forms of smallpox reveals the following important points :

" 1. The blood of the pustular forms of smallpox differs essentially from that of the purpuric form. This is definite and constant and is of value in differential diagnosis.

" 2. The platelets are greatly diminished in the initial period in all forms of smallpox. In the pustular forms the greatest diminution is reached in the vesicular stage, followed by a rapid rise through the pustular stage into the desiccation period. In the purpuric form the platelet count shows a consistent downward course until death.

" 3. The total leucocyte count shows at the onset an increase, as a rule, in proportion to the severity of the subsequent course of the disease. In the mild pustular forms a definite leukopenia is present in the maculopapular stages. In the severe and fatal pustular forms a high total count is maintained throughout the course of the disease. Its maximum is reached during the early part of the desiccation period. In the purpuric form an initial hyperleukocytosis is steadily maintained. This is considerably higher in the primary type than in the secondary type. There are few exceptions, both in the pustular forms and in the purpuric form, in which a leukopenia or a normal leukocyte count persists throughout the course of the disease.

"4. The polymorphonuclear neutrophil percentage shows a steady downward course in all forms of smallpox except in the desiccation period of the severe and fatal pustular forms. A definite neutropenia of 40 per cent. is recorded during the maculopapular stages in the mild form which shows a slight rise during the subsequent stages, declining again to 47 per cent. in the desiccation period. A definite polynucleosis is present in the initial and the maculopapular stages in the severe and fatal pustular forms. A decisive neutropenia is obtained in many of the late stages of the purpuric form. The neutrophil fall in this form is strikingly sudden and spectacular in the presence of a hyperleukocytosis.

"5. The temperature and the polymorphonuclears run a parallel course while the total leukocyte count shows a reverse curve in all forms of smallpox.

"6. No characteristic changes are noted either in the hemoglobin or in the erythrocyte count. The fact is of significance in the purpuric form, in which there are morphologic and qualitative changes of an advanced anaemia, usually accompanied by demonstrable, profuse hemorrhages. A definite secondary anaemia may develop in severe pustular and protracted secondary purpuric cases, in which a quantitative decrease of the hemoglobin and of the erythrocytes, together with a proportionate morphologic variation, is demonstrated. The decrease may be of such gravity as to require restorative measures.

"7. Morphologic changes in the leukocytes and the erythrocytes indicate a severe stimulation of the bone marrow and, in themselves, merely signify various degrees of toxemia or infection. In the blood of the purpuric form, however, there is a series of characteristic metamorphoses in the mature leukocytes which appears to indicate early degenerative changes, specific only in this form of smallpox, and which has served as the only positive laboratory evidence in its diagnosis. This often occurs before any of the clinical signs are evident."

*Conclusions.*—"The blood of smallpox shows characteristic findings which, if properly interpreted, are of definite diagnostic and prognostic value.

"1. The earlier the rise of the platelets, the sooner the approach of the desiccation period, prognosticating a shorter course of the disease.

"2. A definite leukopenia during the maculopapular stages indicates, as a rule, a mild discrete form. A progressive leukocytosis with an early high polynucleosis predicts a severe form. The higher the values, the more probable the fatal outcome.

"3. The early appearance of normoblasts, basophilic stippling and polychromatophilia, without evident anaemia, is an infavourable sign. It invariably means the purpuric form of smallpox.

"4. Condensation and fragmentation of mature leukocytes are found only in the purpuric form of smallpox. They appear comparatively early in the primary type of purpuric smallpox and are usually accompanied by pathologic normoblasts, basophilic stippling and polychromatophilia, without visible anaemia.

"5. A rapidly progressive, absolute lymphocytosis is a constant characteristic of purpuric smallpox.

"6. Scarlatinal and other exanthems, infectious purpura and toxic rash with petechiae, etc., can be definitely differentiated from the purpuric form of smallpox during its erythematous stage by these blood findings."

A. G. B.

DA ROCHA (Franco) & RANGEL (Mario). Tratamento da variola pelo Xilol. [**The Treatment of Smallpox by Xylol.**]—*Rev. Med.-Cirurg. do Brasil.* 1926. May. Vol. 34. No. 5. pp. 215–217.

During a period of five and a half weeks in March and April of this year there came under the authors' care 145 cases of smallpox, 26 of the discrete form, 20 generalized, 87 confluent, and 12 haemorrhagic. Of this number, 18 of the confluent and 9 of the haemorrhagic died, giving a mortality of 18·62 per cent. The treatment employed was xylol in doses of 20–30 drops for children, 80–120 for adults, given in water, milk, or wine, thrice daily. If administered in the early stages it appeared to prevent suppuration ; in the pustular stage it caused a drying up of the pustules, and it lessened or prevented scarring. It is practically ineffectual in haemorrhagic cases or in confluent forms in debilitated subjects.

The use of this drug in variola was first recommended by ZUELZER in 1871, and its reputed benefits found confirmation from WICHNEWSKY in 1903, and BELIN in France in the following year.

H. Harold Scott.

KADANER (M.). Trois cas de tétanos à Stanleyville. [**Three Cases of Tetanus at Stanleyville.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Jan. Vol. 5. No. 2. pp. 125–126.

A short account of three cases of tetanus in adult natives, said to be the first observed in the Stanleyville locality. All were fatal. In two instances infected wounds were present, in the third there was dysentery and no external wound ; the question is raised whether the point of entry was a dysenteric ulcer or the attack allowed the development of bacilli which had previously entered by a breach of skin. [Antitetanus serum is not mentioned and was presumably not available.]

A. G. B.

HEALTH. Melbourne. 1926. Jan. Vol. 4. No. 1. pp. 28–29.—**Commonwealth Serum Laboratories. The Serum Treatment of Tetanus.**

Of eight cases of tetanus in children treated at Brisbane with "Commonwealth" serum only one died. The average incubation was 10$\frac{1}{3}$ days in six cases in which the period could be ascertained and in two of these only seven days. On admission 90,000 units were injected, 75,000 intravenâ and the rest in muscle, repeated as a rule in this or smaller dosage on the two succeeding days. The patients who recovered received from 120,000 to 330,000 units. All but one were between 5 and 9 years of age.

A. G. B.

LHUERRE (H.). Sulfate d'atropine et sérothérapie dans le traitement du tétanos. [**Atropine Sulphate and Serotherapy in the Treatment of Tetanus.**]—*Bull. Soc. Path. Exot.* 1926. Jan. 13. Vol. 19. No. 1. pp. 66–69.

The author has been in charge of the Infectious Diseases part of the Native Hospital at Dakar for four years and has had many cases of tetanus under his care. Treated in the usual way 77 per cent. died.

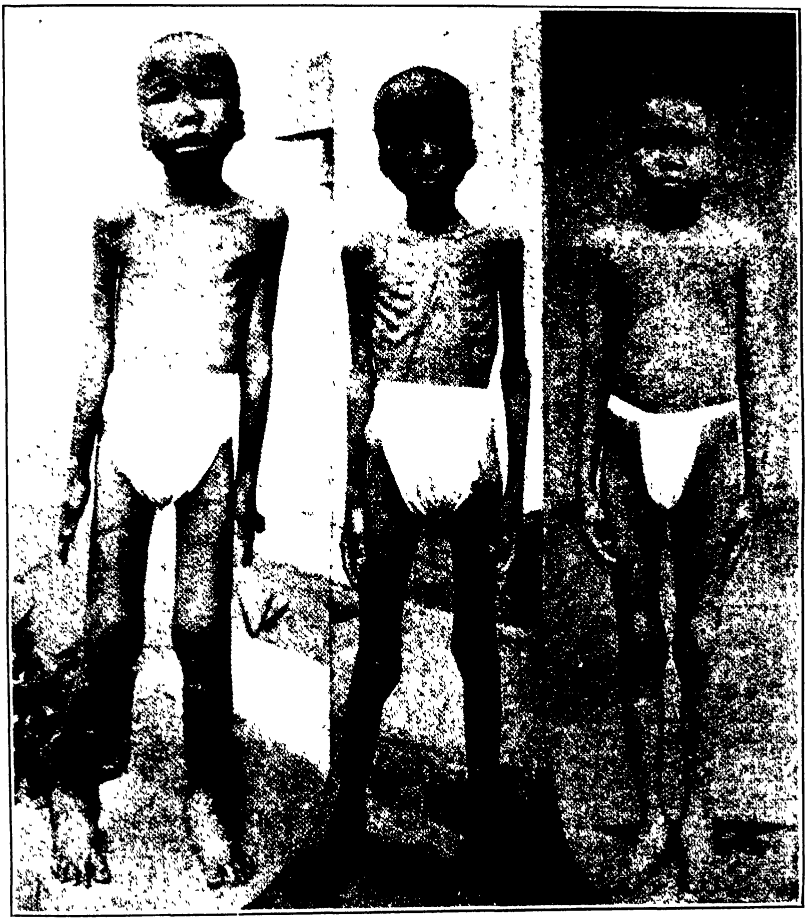
Experience with plague has shown that the West African native tolerates injections of serum in his veins up to 100 and 150 cc. He therefore gave 100 cc. of antitetanus serum in one dose daily by vein till the symptoms of spasm and hyperexcitability were clearly diminished, and to protect the muscles served by the phrenic, glossopharyngeal and pneumogastric nerves from the influence of the tetanic toxin he used belladonna, with bromide, chloral and morphia. Later, for the belladonna he substituted a hypodermic injection of sulphate of atropine. Since he has employed large doses of serum intravenâ and atropine he has had 16 tetanus cases, of which 12 have recovered.

A. G. B.

NORMET. La " Bouffissure d'Annam." [**Annam Swelling.**]—*Bull. Soc. Path. Exot.* 1926. Mar. 10. Vol. 19. No. 3. pp. 207–213. With 1 text fig.

This name is given to a condition in which the patients have oedema, more or less general, of the cellular tissue and dropsy of the serous cavities, especially the peritoneal. Other cardinal symptoms are loss of flesh with muscular wasting and anaemia. Cardiac or renal symptoms are absent. There are no nervous symptoms, which puts beriberi out of question, but the disease is probably one of deficiency. The patients are workers on the land or coolies ; persons in easy circumstances are never affected, nor are the coastal inhabitants who live on fish. Cases occur through the year, but are especially numerous in times of food scarcity. At first glance the victim appears fat and well-liking, but closer inspection reveals the underlying emaciation which is most prominent at the shoulders and upper part of the chest. He is dulled, replies slowly to questions, his mouth is usually open and his gaze vacant. The anaemia may be such as corresponds to 600,000 red cells and 10 per cent. haemoglobin, or is less extreme. The diagnosis is confirmed by the examination of the blood and urine for urea ; in Annam swelling the amount in each is diminished. The urea excreted in the urine may be 8 gm. in 24 hours, and that of the blood may not reach 25 cgm., or these figures may be considerably less. Another less important symptom is arterial hypotension, and yet another a peculiar dryness of the skin.

At autopsy the organs are extremely pale, and fluid is found in all the serous cavities. To gross appearance and under the microscope, the organs are normal. Most of the patients have intestinal parasites, but these infestations are very common in Annam. Administration of chloride of calcium drives away the oedema, but does not avert death. Overfeeding gives no result ; the food is not assimilated. The author therefore determined to inject a nitrogenous substance in the most assimilable form, that of amino acid, and choose glycocoll as of moderate price and borne well in large doses. BROUHA and FREDERICQ have demonstrated its vaso-dilator action in small doses. Experience has indeed shown that small doses cause the oedema of the tissues and serous cavities to disappear and that the drug acts like a catalyser on the assimilation of nitrogenous substances. A daily dose of 20 cgm. for ten days in subcutaneous injection rids the patient of the oedema and improves his assimilation. After a week, and then after a fortnight, the course is repeated. The formula is—Glycocoll 4 gm., salt solution ·8 per cent., 1,000 gm. Formerly, whatever the treatment, the patient was carried off sooner or later by profuse diarrhoea, or progressive cachexia, or syncope; the mortality was 95 per cent. Now recovery is almost invariable in a few weeks. A photograph represents a boy (1) swollen with the disease; (2) emaciated after the loss of the fluid, and (3) after recovery of subcutaneous fat. The appetite is by then large, and it is safe to overfeed. In two months the appearance is normal. For the anaemia, which is slow in disappearing-citrate of soda and "tartrate ferrico-potassique" in intravenous injection are used. With recovery the urea in both blood and urine increases. In some instances, in addition to the glycocoll treatment, it is necessary to tap the peritoneal cavity. It is stated that the disease has thousands of victims among the agricultural population, with whom rice constitutes almost the sole food.



Annam Swelling -left, on arrival at the hospital, centre, after disappearance of oedema and ascites, right, recovered.

[Reproduced from the *Bulletins de la Société de Pathologie Exotique*.]

[One is reminded of epidemic dropsy and famine dropsy. A similar condition was described by BIGLAND from East Africa (*Lancet*, 1920, Vol. i, p. 243; this *Bulletin*, Vol. 14, p. 76). In famine dropsy the pulse is slowed. A symptom which does not find mention here.]

A. G. B.

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KÉRANDEL (J.). Sur la bouffissure d'Annam et sa pathogénie. [**Annam Swelling and its Pathogenesis.**]—*Bull. Soc. Path. Exot.* 1926. Apr. 14. Vol. 19. No. 4. pp. 302–310. [1 ref.]

Kérandel agrees with NORMET that this disease is both frequent and serious in Annam; it is the chief cause of mortality at the hospitals at Hué and elsewhere. There have long been local controversies about it, some observers attributing it to ancylostomiasis, others to malaria or beriberi. THIROUX in 1920 [see this *Bulletin*, Vol. 17, p. 238] attributed the syndrome to the association of ancylostomiasis and malaria with syphilis; he entitled his paper, "Grave Anaemia following multiple Infections in Annam," and states that 95 per cent. gave a positive Bordet-Wassermann. Kérandel is inclined to follow THIROUX and stresses the significance of hereditary syphilis.

The swelling may be slight or so extreme that "the patient appears bloated like a leather bottle." The anaemia is very variable, its grade corresponding with that of the ancylostome infection. Ascites was seen in 30 per cent. of [an unnamed number of] cases; in its absence there is always some distention and relative dulness of the abdomen, which is an early sign. In 77 per cent. of cases the liver was diminished in volume, the spleen hypertrophied. Besides the diminution of urinary urea reported by NORMET, there is a reduction of chlorides and oliguria. Other symptoms are dulness and extreme emaciation.

Five autopsies have been made, but have revealed nothing striking. They confirm the atrophy of the liver, which is of yellowish, earthy, or "dead-leaf" colour. There seems to be a tendency to fibrosis of the viscera. The mesentery, when the patient dies with oedema, is very oedematous. Few microscopic examinations are on record.

The great majority of the patients harbour numerous ancylostomes, but this does not explain every case; in four, none was found in repeated examination of stools. A table of 29 cases, showing the sex and age, occupation, number of ancylostomes (in decreasing order), haemoglobin value, W.R. and degree of swelling, shows that whereas the anaemia varies with the degree of ancylostome infection, the oedema does not; general anasarca occurred in several cases with 30 worms or less, and relatively high haemoglobin values. Nor is the oedema attributable to malaria. The disease may occur in patients from the delta where fish abound, and in seasons of plenty as well as scarcity; he agrees that it is rarely met with in the well-to-do. It is most frequent between the ages of 12 and 31, rare above or below these limits; many subjects are about 20 years. This limitation of age would, in his opinion, be against a dietetic origin. Signs of inherited syphilis are found in exceptional frequency in these patients. In 51 cases the serum reaction was tested by one or two methods; the percentage of positives was 83, though the serums of other patients, in whom syphilis was suspected, examined at the same time, gave the smaller percentage of 60.

The author says that the results of treatment tend to confirm the importance of the part played by syphilis. Mercury was badly tolerated and "914" was given. The general state improved, but it appears that 20 per cent. died either in hospital or after removal.

In the discussion which followed M. LEGER mentioned other parts of the French Colonial Empire where ancylostomiasis, malaria, and syphilis abound but this curious disease is absent. MOTAIS said that he took part in the study made by THIROUX and that most of the patients recovered with thymol, quinine, "914," diuretics, and a milk diet; he believed, however, that some part of the aetiology remains undiscovered. GAUDUCHEAU said that the limitation of age was not against a food deficiency origin, because the physiological needs of the organism vary with age and are especially great in the growth period. "In these countries," he said, "doctors ought to interest themselves more than they have done up to the present in the diet of their patients, draw up complete food balance sheets and make sure that the local dietaries really correspond to the needs of the economy."

A. G. B.

HINGSTON (H.). **Epidemic Dropsy and Secondary Anaemia of Pernicious Type.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. pp. 373–375. [1 ref.]

This is a remarkable record from the Medical College Hospital, Calcutta, which must be given in some detail.

A Mohammedan male was admitted on January 8th, 1926, complaining of swelling of the legs, general weakness and shortness of breath, difficulty of walking owing to stiffness of the legs, and failing vision. On examination the abdominal wall and scrotum, as well as the legs, were found to be swollen. The heart was dilated with a systolic murmur and pulse 120. The R.B.C.s were 900,000; haemoglobin 25 per cent.; colour index 1·39; marked poikilocytosis, many normoblasts and a few megaloblasts, W.B C.s 4,300; Wassermann negative. No enlargement of glands or spleen. Marked spasticity of legs and arms. Deep reflexes greatly increased with sustained ankle and patellar clonus; plantar reflexes flexor. No sensory loss or hyperaesthesia. The ophthalmic surgeon reported massive round haemorrhages of both retinas.

The patient related that on September 21st, 1925, he visited relations in the Jessore District, a household of 22 persons. On October 6th rice brought from a river-side village caused diarrhoea, and after a few days was returned, but on October 13th the servant whose duty this was could not go because his legs were swollen. On October 29th, at which date there had been no other cases of illness, the patient returned to Calcutta, and a few days later had to take to bed owing to swelling of his legs and face. He returned to the Jessore village on November 30th and found that five inmates had died of "swelling" and all the rest were ill, with weakness, anaemia, and, in some instances, stiffness of legs and failure of vision, following the swelling. By the end of December, 15 of the 22 were said to have died. The patient himself received iron and arsenic treatment in hospital, rapidly improved and left on March 3rd.

On February 20th his brother was admitted with the same train of symptoms, including retinal haemorrhages and spasticity. He also improved under treatment. Two other members of the family were examined, one of whom still had retinal haemorrhages.

Major Hingston discusses this "family tragedy." He thinks that the primary disease was epidemic dropsy, and that it was due to infection of the rice consumed, but can find no record of pernicious anaemia as a sequela. The cases seem to show "the continued action of a primary acute infection" which the author suggests is an indication of the causation of many of the acute anaemias that are common in Bengal. The spasticity he would explain by small haemorrhages in motor tracts of the cord, such as were seen in the retinas.

Major Hingston notes that the tragedy did not create any unusual excitement, and would not have been heard of if one of the victims had not been a Calcutta resident and an educated man. It is probably not an isolated occurrence.

A. G. B.

DE (S. N.). **Epidemic Dropsy.**—*Indian Med. Rec.* 1926. July. Vol. 46. No. 7. pp. 193–195.

An account of a small epidemic in 1919 in 76 Bengali Hindus. These were members of 13 families, and intervals of 3–5 days were noted between the first and subsequent cases; 32 per cent. of the cases were in children of 5–10 years. The symptoms were anorexia, malaise, palpitation, dyspnoea, oedema of lower extremities in all cases; fever in 63 and gastro-enteritis in 53. Rich and poor were equally affected; samples of rice collected were of varying grade from the coarsest to the best. The author attributes the condition to toxins, rather than food deficiency, toxins elaborated in the digestive tract owing to "faulty metabolism of protein in general and rice in particular." Where members of two families were attacked they were in frequent and close contact.

A. G. B.

ARCHIBALD (R. G.). **A Case of Sickle Cell Anaemia in the Sudan.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Jan. 21. Vol. 19. No. 7. pp. 389–393. With 4 figs. on 1 plate. [7 refs.]

So far sickle-cell anaemia has been recorded only in America, in negroes (see this *Bulletin*, Vol. 20, p. 670, and Vol. 21, pp. 670, 671, and 926) and a mulatto (see this *Bulletin*, Vol. 7, p. 329). The patient in the present instance was an Arab boy who had suffered since infancy from debility and irregular attacks of fever. The parents were healthy intelligent Arabs, and there was nothing in the family history that had any apparent bearing on the case. The associated symptoms were debility, pyrexia, slight jaundice, oedema of the feet, and enlargement of the liver and lymphatic glands. Blood examination showed, besides the characteristic sickle-shaped red cells, a diminution of the red cells, leucocytosis, low haemoglobin percentage, erythroblasts, and phagocytosis of red cells.

A. A.

ANDERSON (Horace B.). **Sickle-Cell Anaemia. Report of an Active Case.**—*Amer. Jl. Med. Sciences.* 1926. May. Vol. 171. No. 5. (650). pp. 641–648. With 4 text figs. [8 refs.]

This case occurred in a negro boy, born and reared in Philadelphia. During the first six weeks in hospital the characteristic "sickling" phenomenon was not in evidence; afterwards the red blood corpuscles on standing for 24 hours showed 90 to 95 per cent. " sickling." The 12 year old sister also showed 50 to 75 per cent. " sickling," but the father appeared to be normal. The mother and a brother who formed the family complement were not accessible.

A. A.

PERUZZI (Mario). Granulomi e granulomatoidi. Ricerche-istologiche e studio sistematico con 3 tavole di microfotografie. [**Granulomata and Granuloma-like Conditions. Their Histology and Systematic Study.**]—*Ann. di Med. Nav. e Colon.* 1926. Mar.–Apr. Year 32. Vol. 1. No. 3–4. pp. 129–186. With 27 figs. on 3 plates. [222 refs.]

This article presents an excellent account of the various granulomata and granuloma-like conditions. The subject is treated in several parts, each with sub-divisions. The first deals with the characters common to granulomatous processes, describing the exudations and the various cells found, their origin and the changes which they undergo. The second goes still further into the histology of the subject, cellular infiltrations, necrotic degenerations and the cytological characters seen in tuberculosis, leprosy, blastomycosis, leishmaniasis and other conditions. In part III the various granulomata are taken up *seriatim,* and for each is given a short account of the general characters and the histological picture, followed by a few remarks on the condition, very apt and to the point. Tuberculosis, syphilis, leprosy, glanders, rhinoscleroma, yaws, cutaneous and muco-cutaneous leishmaniasis, granuloma venereum, verruga peruviana and schistosomiasis are considered under the heading " Infective granulomata," showing that the author interprets the term somewhat widely. A second sub-section treats of the mycetomas—Madura foot, actinomycosis, blastomycosis and sporotrichosis ; the third of lymphogranulomata, including climatic bubo, Hodgkin's disease, trachoma and mycosis fungoides. The " granulomatoid " conditions are divided into three groups : the *ulcerous,* of which phagedaenic tropical ulcer is the type, the *vegetating,* which is the same as, or closely allied to, the botryomycosis of animals, and the *nodular,* by which is implied the tuberculoid changes set up by the presence of foreign bodies.

There is an appendix in which the characters already described in moderate detail are recapitulated in a brief form as a sort of diagnostic table. There are three plates of 27 microphotographs very well reproduced.

It is not possible to do more than indicate the scope of this article which, in spite of its length, is far too short to treat so vast a subject adequately. The diagnostic table would be useful as an indication or guide for students at a class lecture or demonstration, but those who are engaged in the study of the question know that the differences are not so clear cut as the author would have us believe [would that they were !]. This paper would form an excellent basis for a larger work and might well be amplified to book-form.

H. Harold Scott.

PAWAN (J. L.). **A Case of Cerebro-Spinal Meningitis.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 195–196.

The isolation of the meningococcus in Trinidad and its apparent association with otitis media are the chief points of this paper. Gram-negative diplococci were found in the cerebro-spinal fluid and were grown on glucose hydrocele agar; serological tests were not made. Death occurred ten days after the patient's admission to hospital; the diplococci were found also in exudate at the base of the brain and in the mastoid cells.

A. G. B.

RILEY (William A.) & WATSON (Cecil J.). **Histoplasmosis of Darling. With Report of a Case originating in Minnesota.**—*Amer. Jl. Trop. Med.* 1926. July. Vol. 6. No. 4. pp. 271–282. With 3 text figs. [20 refs.]

A fourth case (in this instance in a German woman who had lived continuously in Minnesota for 42 years) of histoplasmosis, a disease hitherto known only from the three cases reported by DARLING from Panama. In this case as in those the spleen was greatly enlarged, the lungs granulomatous and fibrosed, and enormous numbers of Darling's *Histoplasma capsulatum* were found in the phagocytes (macrophages) with which the lung, liver, spleen and lymph-glands were loaded. The enigmatic nature of this organism, which has variously been regarded as a Protozoon (a Coccidium, or a Leishmania or a Leucocytozoon), as a yeast, and as a mould, is here briefly discussed, as well as the nature of the disease caused by it, which has been supposed to be identical with epizootic lymphangitis of horses. The authors accept the opinion of ROCHA LIMA that the organism is closely related to *Cryptococcus farcinimosus* of Rivolta (the cause of epizootic lymphangitis, variously considered to be a yeast or a mould), but they incline to think that the disease is not actually identical with epizootic lymphangitis, though its organism may bear a relation to the organism of that disease analogous with that existing between *Leishmania donovani* and *L. tropica.*

A. A.

CADE (A.), MORENAS & RAVAULT (P.). Parasitisme intestinal et tuberculose. [**Intestinal Parasitism and Tuberculosis.**]—*Arch. des Malad. de l'Appareil Digestif.* 1925. Dec. Vol. 15. No. 10. pp. 991–1004.

This is a discourse on a speculative subject. The authors allow that the association of tuberculosis with intestinal parasitism may sometimes be fortuitous, but yet quote impressively statistics given [no exact reference] by L. BERNARD, SALOMON, and MÉLAMET of 40 per cent. of cases observed by them [total number not stated] of pulmonary tuberculosis associated with intestinal parasitism. They themselves produce four cases of combined pulmonary and visceral tuberculosis having dysentery [amoebic and unspecified] as an antecedent, three with Giardia infection as an antecedent, one having strongyloides as an antecedent, and one case of ileo-caecal tuberculosis coincident with Trichocephalus. They also discuss the inverse aspect of the association —parasitism subsequent to tuberculosis. They discuss again, when the parasitism is antecedent, the influence and line of action of the intestinal parasites; do they prepare the soil for the tubercule bacillus, in a general way? do they form a muster-ground for the bacilli, in the intestine? do they themselves perchance inoculate the bacilli? All these are very familiar questions.

A. A.

MARCOU-MUTZNER. L'antagonisme paludo-tuberculeux; un projet de malariothérapie tuberculeuse. **[Antagonism between Malaria and Tuberculosis. Proposed Malariatherapy.]**—*Presse Méd.* 1926. Aug. 18. Vol. 34. No. 66. pp. 1052–1053.

It is generally considered, writes the author, that malaria makes the bed for tuberculosis. This is not the case in Corsica, where both infections are common. In the last six years among more than a thousand patients he has not seen the two diseases in association except in ten instances, or about 1 per cent. If they were not antagonistic they would be met with, he thinks, much more frequently in the same patient. Moreover, whereas tuberculosis in Corsica is an acute disease progressing nearly always to death in 3 to 6 months, in the hundredth patient who is infected with malaria it takes a chronic sclerotic form with long periods of arrest. Malaria, on the other hand, is mild in Corsica, and when properly treated is not a serious disease. He proposes therefore to treat tuberculosis by malarial inoculations.

A. G. B.

REYNAUD (Gustave). Le " foie tropical." **[Tropical Liver.]**—*Rev. Prat. Malad. des Pays Chauds.* 1926. Mar. Year 5. Vol. 6. No. 1. pp. 6–21. [3 refs.]

The author discusses and emphasizes the preponderating part taken by the liver in the general body economy. points out that the commonest complaints in Europeans in the tropics are " bowel " ones, and lays stress on the wrong habits, diet, and clothing of the Europeans—especially over-indulgence in alcohol. The consequent ill health is due to a derangement of liver function produced by these misdoings: " Tropical liver " designates a state of hyperfunction and hyperaemia of that organ in which climate plays but a secondary rôle, the " primordial " being played by ignorance and neglect of hygiene. [Amoebic hepatitis is not mentioned—one may conclude therefore that the author excludes this definite and proved entity from his group —" Tropical liver." For the rest—there is as yet no satisfactory test for liver function.]

H. M. Hanschel.

GAEHLINGER (H.). Quelques applications des travaux recents au traitement thermal de l'amibiase et du paludisme. **[Applications of Recent Work to the Spa Treatment of Amoebiasis and Malaria.]**—*Rev. Prat. Malad. des Pays Chauds.* 1926. Feb. Year 4. Vol. 5. No. 10. pp. 460–475.

It has been said that one cannot name an affection of the liver which is not followed sooner or later by intestinal disturbance, just as chronic irritation of the mucosa of the colon rapidly brings about a change of the liver functions. Intestinal amoebiasis and malaria furnish an example of this interdependence. DAVID and SEGAL state [this *Bulletin*, Vol. 21, p. 597] that of patients with chronic malaria a larger percentage harbour intestinal parasites, chiefly nematodes, than in the case of other patients. The parasites secrete toxins which cause anaemia, and the blood corpuscles are rendered more vulnerable to the malarial parasite. According to LOEPER in cases of colitis the red cells are diminished in number with a slight haemolytic jaundice and the anaemia is caused not only by haemolysing microbian toxins, but also by the absorption of cell products, pancreatic and intestinal. If there is also hepatic insufficiency, there is every inducement for the multiplication of plasmodia, and treatment must have regard to each element of the symptoms. Similarly LE NOIR and Mathieu DE FOSSEY (*loc. cit.* Vol. 19, p. 688) have shown that the surest way to manifest a latent amoebic dysentery consists in the administration of biliary extracts in increasing doses till diarrhoea appears ; motile forms of the amoeba are then seen. The same result can be attained by stimulation of the biliary secretion as by the administration of Chatel-Guyon water. Lamblia has been shown to harbour in the duodenum and LIBERT has found haematophagous amoebae in the same situation, so that " the hepatic function reacts on the course of amoebiasis."

These observations are then applied to the treatment of malaria and amoebiasis at Chatel-Guyon.

A. G. B.

PANAYOTATOU (Angelica). **Cystitis caused by** *Amoeba histolytica* **and** *Schistosoma mansoni.*—*Brit. Jl. Children's Diseases.* 1925. Oct.-Dec. Vol. 22. Nos. 262-264. pp. 289-291.

Dr. Panayotatou records the case of an Egyptian boy at Alexandria, aged seven, who had passed blood in the urine for four months. There was no history of dysentery. After centrifugation of the urine there were found a large number of amoebae and ova of Bilharzia of the *S. mansoni* type. The amoebae were 12-22 "mm. in size" and showed granular endoplasm and translucid ectoplasm. No amoebae or ova were found in the stools after repeated search. Emetine treatment led to complete recovery.

A. G. B.

SOETEDJO. Over het voorkomen van rheumatische hartaandoeningen in Nederlandsch-Indië. [**The Occurrence of Rheumatic Affections of the Heart in the Dutch East Indies.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 2. pp. 236-241. [11 refs.] With 3 figs. on 1 plate.

Aschoff's tubercles in the heart muscle, consisting of large cellular elements, with large, often polymorph nucleus, round an apparently necrotic centre, are considered to be pathognomonic for rheumatic affections. In 20 cases of endocarditis in the Dutch East Indies the author found these units only once, in a native girl of about 16 years. This was the only instance in a series of 2,300 microscopical examinations of hearts after death from natural causes. These facts prove that real rheumatic infections are extremely rare in the D.E.I.

W. J. Bais.

VAUGHAN (Kathleen). **Osteomalacia in Kashmir.**—*Brit. Med. Jl.* 1926. Mar. 6. pp. 413-415.

Osteomalacia, the author writes, is extremely common in Kashmir. During one of the three years in which she was medical superintendent of the Zenana Hospital at Srinagar, of 29 Caesarean sections 25 were due to pelvic deformity from that cause. Almost all Kashmir women who have borne children are affected in some degree, with the exception of the boatwomen, who live on the Jhelum river, are out in all weathers, take raw vegetables with their rice, and drink the milk of the cow or goat that is kept on board. " The disease is unknown among men in any part of the world " [others state that it is very rare in males]. It is worse in winter and early spring during and after confinement to the house. A common history is, confinement to the house at 8 or 9, marriage at 10 or 11, menstruation at 12 or 13, and restriction to the house till the first child is born. Lactation is continued in Kashmir from 2 to 4 years. The disease usually begins with the first pregnancy, or soon after marriage.

The most obvious symptoms are pains in the bones, ribs, pelvis and shafts of the long bones, which are tender on pressure about the centre. The epiphyseal lines seem to be quite unaffected and rickets is rare in Kashmir. Tetany is a common accompaniment. Many of the males of osteomalacia families suffer from tuberculosis, " too constant a relationship to be mere chance." Two indigenous cures for " trouble in the bones " are: a special fireclay, which analysis showed to contain 16 per cent. of calcium phosphate and other minerals; fish liver pills. The author found that out-patients given cod liver oil and sent out on the lake in open boats improved rapidly.

The details of dietary are meagre. The richer classes cook all their food and no raw vegetable or fruit is eaten. The water is usually contaminated. In the winter the women go out as little as possible, live in the lowest rooms, where the windows are very small and are often closed by wooden lattice work; some rooms have no windows, but " that the light supply is sufficient for health in all ordinary life is proved by the rarity of rickets." Hills overhang the city of Srinagar, and in the winter a thick pall of smoke and fog. The importance of light is shown by the statements that sunlight alone can cure the disease, and that whereas among Afghan women at Peshawar who live an open-air life the disease is unknown, cases are reported in Hindu shopkeepers' wives who were kept in purdah; again, in Bombay the Parsee women are free, but the weavers, who live in dark rooms behind the looms, suffer severely [see also this *Bulletin*, Vol. 22, pp. 977–9].

A. G. B.

GARDNER (Fletcher) & BROWN (Aubrey K.). **Typhus Fever along the Rio Grande in the United States in 1924 and 1925.**—*Milit. Surgeon.* 1926. Feb. Vol. 58. No. 2. pp. 165–169.

The authors refer to the epidemic studied by SINCLAIR & MAXCY, though they do not give a reference to their paper [see this *Bulletin*, Vol. 22, p. 656]. In all cases under observation clothing, bedding, and bodies were found free from lice, and in a U.S. Army Post no lice were ever found. They suggest that transmission may have been effected by fleas. Two cases are described; both gave a Weil-Felix reaction, which the authors consider positive if agglutination occurs in dilution greater than 1 : 40. The only point not noted in the previous paper is " the typical odor, which resembles that of musty straw." [SINCLAIR & MAXCY found head lice in 12 of 20 families in which cases occurred and regard the head louse as the probable vector.]

A. G. B.

DESTÉFANO (Francisco) & VACCAREZZA (Raúl F.). Tratamiento del carbunclo humano. Resultados comparativos de diversos tratamientos sobre 414 casos de carbunclo. Suero anticarbuncloso. Suero normal. Inyecciones de peptona. [**Treatment of Malignant Pustule in Man.**]—*Semana Médica.* 1926. Jan. 28. Vol. 33. No. 4 (1672). pp. 165–194. [19 refs.]

This is an interesting study of the results of various methods of treatment of anthrax infection in a large number of cases. Of a total of 414 patients, 82 were treated with injections of specific antiserum, 17 with normal bovine serum, 192 with peptone (5 per cent. Witte's peptone in distilled water with 0·5 per cent. NaCl, sterilized by heating for 15 minutes at 120° C., filtered and sealed in ampoules), starting with 10 cc. later 30 cc., twice or three times daily intragluteally injected, 88 with peptone and antiserum ; 13 received symptomatic treatment only. The remaining 20 were subjected to various measures, such as antistreptococcus serum, neosalvarsan, etc. The subjoined table gives a summary of the results, the third column, denominated Revised Mortality, giving the percentages after excluding those patients who died within 48 hours of beginning treatment.

It will be seen that the best results were obtained by the peptone injections intramuscularly. When the intravenous route was attempted alarming symptoms were produced—headache, cough, palpitation, and if given otherwise than slowly there were fever, shivering, respiratory and circulatory distress with nausea or vomiting.

| Treatment. ... | No. of cases. | Mortality. | Revised Mortality. |
|---|---|---|---|
| | | per cent. | per cent. |
| Antiserum alone ... ... | 82 | 15·85 | 10·38 |
| Ditto+some other treatment ... | 141 | 19·14 | 12·97 |
| Normal Bovine serum ... ... | 17 | 29·41 | 25·00 |
| Ditto+other treatment ... | 33 | 21·21 | 18·75 |
| Peptone alone ... ... ... | 192 | 10·93 | 9·04 |
| Ditto+other treatment ... | 280 | 12·85 | 9·29 |

H. Harold Scott.

WEINBERG (M.). Enquête sur les traumatoses, et en particulier sur la gangrène gazeuse, chez les blessés du front marocain. [**Inquiry on Wound Infection, especially Gaseous Gangrene, in the Wounded on the Moroccan Front.**]—*Bull. Soc. Path. Exot.* 1926. Feb. 10. Vol. 19. No. 2. pp. 106–115. [1 ref.]

Infection of wounds with anaerobic organisms is found among the natives of Morocco. Dr. CRISTIANI at Fez has seen six cases of tetanus in country Arabs, and of gaseous gangrene has treated about three cases yearly. In fact gaseous gangrene is so familiar that a severe wound of a limb is bound firmly to prevent the entry of air, and the infection is designated by the Arabs by a word which means wind. Many cases of both tetanus and gaseous gangrene have occurred in wounded soldiers in the recent campaign ; the organisms correspond fairly closely with those isolated in Europe in the War of 1914–18. Antigangrenous serum has proved very effective.

A. G. B.

Bloedorn (W. A.) & Hakansson (E.). Some Observations regarding Culebra [Virgin Islands].—*U.S. Nav. Med. Bull.* 1926. July. Vol. 24. No. 3. pp. 534–544. With 8 figs. on 5 plates.

Butler (C. S.). The Medical Needs of the Republic of Haiti at the Present Time.—*U.S. Nav. Med. Bull.* 1926. Apr. Vol. 24. No. 2. pp. 269–279. With 2 figs. [8 refs.]

Campbell (George). Focal Infections.—*Jl. Port-of-Spain Med. Soc. for 1924.* pp. 72–85.

Carter (H. F.). [Report on " Kataragama " Fever: its Nature, Causes, and Control. (July 20 to August 4, 1925.)]—*Ceylon Sessional Papers.* Colombo. 1925. No. 37. 9 pp. With 2 plates. [Summarized in *Rev. Applied Entom.* 1926. Mar. Vol. 14. Ser. B. Pt. 3. p. 41.]

Conos (B.). Trois cas de cannabisme avec psychose consécutive.—*Bull. Soc. Path. Exot.* 1925. Dec. 9. Vol. 18. No. 10. pp. 788–793.

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Dabbadie. La méningite cérébro-spinale en Haute-Volta. [Extract.]—*Ann. de Méd. et. de Pharm. Colon.* 1925. Sept.-Oct.-Nov.-Dec. Vol. 23. No. 3. pp. 479–480.

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Huppenbauer (C. B.). Der natürliche Blutatlas.—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Vol. 29. No. 1. pp. 169–178. With 4 text figs.

Ilvento (Arcangelo). Notes sur une carte des épidémies dans les pays avoisinant la Méditerranée.—*Matériaux pour l'Etude des Calamités.* Geneva. 1925. July-Sept. Vol. 2. No. 6. pp. 119–150. [1 ref.] [Historical.]

Jose (I. B.). Diseases of Australian Aboriginals. (1) Prostatic Calculi in an Australian Aboriginal.—*Med. & Scientific Arch. of the Adelaide Hospital.* No. 4. (Supplement to Ann. Rep. of the Adelaide Hospital for 1924.) p. 48.

Lyautey. La médecine au service de la colonisation. Allocution prononcée à la Séance Inaugurale des Journées Médicales de Bruxelles, le 26 juin 1926.—*Bruxelles-Méd.* 1926. July 4. Vol. 6. No. 36. pp. 1064–1069.

Marini; Massias (C. H.) Traitement du chancre mou et du bubon par vaccinothérapie.—*Arch. Inst. Pasteur de Tunis.* 1925. Dec. Vol. 14. No. 4. pp. 465–468.

Montes (José E.). Propiedades no señaladas del extracto de tiquitiqui (salvado del arroz blanco).—*Los Progresos de la Clin.* Madrid. 1922. Nov. Year 10. No. 131. Vol. 24. No. 2. pp. 154–159. [2 refs.]

Muraz. Les superstitions locales, les coutumes et les pratiques de la médecine indigène dans la race Sara (Sud du Tchad).—*Ann. de Méd. et de Pharm. Colon.* 1926. Jan.-Feb.-Mar. Vol. 24. No. 1. pp. 5–23.

Pawan (J. L.). Stability of Insulin in Trinidad.—*Jl. Port-of-Spain Med. Soc. for 1924.* pp. 43–44.

Ramond (Félix) & Zizine (Pierre). L'hépatisme et son traitement.—*Rev. Prat. Malad. des Pays Chauds.* 1926. May. Year 5. Vol. 6. No. 3. pp. 101–107.

Ross (J. A.). Notes on Two Albino Africans.—*Kenya Med. Jl.* 1926. Mar. Vol. 2. No. 12. p. 343. With 1 plate.

Weiss (Soma) & Hatcher (Robert A.). A Method for the Quantitative Determination of Small Amounts of Quinin and Quinidin with Bromin Water.—*Proc. Soc. Experim. Biol. & Med.* 1925. Oct. Vol. 23. No. 1. pp. 33–35. [1 ref.]

de Winter (R. P.). Medicaments indigènes.—*Bull. Méd. du Katanga.* 1925. Oct. Vol. 2. No. 5. pp. 214–216.

Zschucke (Hans). Ärztliche Erfahrungen aus Zentralamerika.—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. p. 232.

# REVIEWS AND NOTICES.

LANGERON (Maurice). Mycétomes — Oosporoses — Sporotrichoses — Blastomycoses.—[**Mycetomas — Oosporoses — Sporotrichoses — Blastomycoses.**]—*Roger—Widal—Teissier. Nouveau Traité de Médecine.* Fasc. 4. pp. 445–534. With 40 text figs. [Paris: Masson et Cie.]

Under the term Mycetomas are included inflammatory tumours caused by the proliferation of parasitic fungi in the tissue and characterized by the presence of grains formed of masses of mycelial filaments. While the foot is the most frequent situation of a mycetoma, any other part of the body may be attacked. Mycetomas are divided into two groups: Maduromycoses, in which the grains are formed of large septate hyphae, the causal fungus being a *Hyphomycete*; and Actinomycoses, in which the hyphae forming the grain are very fine and aseptate, the fungus being a species of *Microsiphonales.* Each of these groups is subdivided according to the colour of the grains into black, yellow, and red sections. Detailed consideration of each of these sections follows, and all fungi known to cause mycetomas are dealt with more or less fully. Paramycetomas, or tumours of fungus origin, but which do not form grains, the essential characters of true mycetomas, and Pseudomycetomas, which are tumours clinically simulating mycetomas but not of fungus origin, are also dealt with. Finally, there is a general discussion of the plurality of the causal fungi, the saprophytic origin, pathology, diagnosis, prognosis, treatment and prophylaxis of mycetomas.

The section on Oosporoses treats of those affections due to Microsiphonales, but which are not mycetomas, actinomyces or tuberculoses, in a manner similar to that on mycetomas. Classification is based on the proposals of FOULERTON, and CHALMERS and CHRISTOPHERSON. The *Microsiphonales* are divided into two genera, *Actinomyces* Harz 1877, and *Actinobacillus* Brumpt 1910. Actinomyces is divided into two sub-genera, *Euactinomyces* n. sub. gen., and *Cohnistreptothrix* Pinoy 1911; and *Euactinomyces* is again subdivided into *Parasitici* and *Saprophytici,* the former being split up into the sub-sections *majores, minores* and *breviores.* Under these divisions a list of all the known pathogenic species is given.

On the same general plan Sporotrichoses are dealt with. These are generalized mycotic infections due to fungi of the genera *Sporotrichum* Link 1809 and *Rhinocladium* Sacchardo and Marchal 1885.

Blastomycoses is a vague general term given to those infections caused by pathogenic fungi which reproduce by budding, although the budding, or yeast, stage may be only a phase in their life-history. Thus, a bewildering variety of different clinical conditions and of parasites of widely different systematic position comes within the range of this section. The parasites dealt with belong to the genera *Debaryomyces, Saccharomyces, Willia, Endomyces* (*Saccharomycetaceae*); *Cryptococcus* and *Monilia* Gmelin 1791 (*Hyphomycetes, Blastosporaceae*); and *Mycoderma* (*Hyphomycetes, Arthrosporaceae*). In this section the infections are arranged under a clinical classification according to localization, as the number of different causal fungi makes a satisfactory etiological classification impossible. The principal divisional headings are Blastomycoses of the mucosa, Cutaneous Blastomycoses, Blastomycoses of the bones, Visceral Blastomycoses, Generalized Blastomycoses, and Blastomycetic tumours. In spite of the immense number of species considered, it is concluded that not more than eight species are to be regarded as seriously pathogenic. As in the other sections, diagnosis, prognosis, treatment and prophylaxis are discussed in a general manner.

It is impossible to speak too highly of this admirable work. It contains all the essential facts on the subjects dealt with in a concise form devoid of masses of superfluous detail. The arrangement of the subject matter is such as to ensure the minimum of trouble in obtaining information on any particular parasite or affection. The difficult questions of nomenclature and classification are handled in a masterly manner which gives little indication of the almost hopeless confusion met with in the literature on the subject. The mode of expression throughout, as in all Langeron's papers, is extremely clear and direct and renders the reading pleasant as well as instructive.

P. Tate.

LANGERON (Maurice). Intoxications par les champignons. [**Mushroom Poisoning.**]—*Roger-Widal-Teissier. Nouveau Traité de Médecine.* Fasc. 6. pp. 493–513. With 2 text figs. [Paris: Masson et Cie.]

In this short article of 21 pages M. Langeron gives from the point of view of the ordinary medical man a clear and valuable account of the mushrooms and toadstools and their allies that the practitioner in France —or anywhere in Europe—is most likely to encounter in cases of human poisoning.

Although poisoning by indiscriminate fungal meals is not rare in England, it would seem to be much more common and oftener to have fatal results in France. In 1912 there were 300 cases reported in France, with 100 deaths. By far the most deadly fungus—responsible for about 90 per cent. of the fatal cases—is *Amanita phalloides*. Apart from the more or less toxic effects that may be brought about by idiosyncrasy in the eater, indigestion, long storage or putrefaction, certain fungi contain specific poisons. On this fact ROCH has based his classification of poisonous fungi. M. Langeron has followed ROCH's classification, somewhat modified, and groups his fungi under the following heads :—

(1) Deadly. *Amanita phalloides, A. phalloides* var. *verna* and *A. virosa*. After an incubation period of 8–40 hours, these give rise to a choleraic condition, usually ending fatally with fatty degeneration and necrosis of the liver.

(2) Dangerous. *Amanita muscaria* and *A. pantherina,* giving rise, after an incubation of 1–2 hours, to either gastro-intestinal disturbance or delirium followed by stupor. Seldom if ever fatal.

(3) Irritant. A considerable number of species of different genera, giving rapid rise to gastro-intestinal disturbance, which soon subsides. Very rarely fatal.

(4) Haemolytic. *Morchella esculenta* and *Gyromitra esculenta.* If these are eaten quite fresh the helvellic acid contained may cause haemolysis, with jaundice and haemoglobinuria, accompanied with acute gastro-intestinal disturbance.

(5) Excitant of unstriped muscular fibres. *Claviceps purpurea.* Symptoms of ergotism.

(6) Fungi ordinarily edible, but become more or less poisonous in various ways by alteration.

The classification is neither strictly logical nor strictly scientific, but for the end in view practical enough. Sufficient details for the ordinary practitioner are given of the diagnoses of the more virulent species of fungi, and of the characteristic syndromes, pathological anatomy, pathogeny, prognosis and treatment of cases of poisoning. The medico-legal aspect of poisoning by fungi is briefly touched upon. Under prophylaxis, M. Langeron utters warnings against trusting to popular tests as to the innocence of fungi. He lays proper stress on teaching children to recognize the characteristics of the group to which the deadly Amanitas belong and emphasizes the desirability of every medical man knowing them. With this paper of M. Langeron at hand no French-reading medical man need remain ignorant of what may at any time prove most valuable information. This knowledge is just as desirable in England as in France, and fortunately, as far as the purely English reading practitioner is concerned, it is available, for Mr. J. RAMSBOTTOM's paper on "Edible and Poisonous Fungi" (*Procs. Roy. Soc. Med.,* XVIII (1925), pp. 13–26) covers practically the same ground.

A. T. Gage.

SEYFARTH (Carly). Die Malaria. [**Malaria.**]—*Handbuch d. Speziellen Pathologischen Anat. u. Histologie.* 1926. pp. 177–248. With 18 text figs.

In this article Dr. C. Seyfarth has given a concise and clear account of the morbid anatomy of malaria, based on his own experience and on that of pathologists of many nationalities.

The blood and the various organs are dealt with systematically, and the pathological changes, macroscopic and microscopic, are carefully described; the section on the morbid anatomy of the brain is particularly good. There is a short appendix on blackwater fever. The very full bibliography, including nearly all the recent publications on the subject, will be very useful.

The author remarks that, since the early work of VIRCHOW, MARCHIAFAVA, CELLI, BIGNAMI, and others, attention has been chiefly concentrated upon the aetiology and parasitology of malaria, and that too scanty interest has been taken in its morbid anatomy. This view seems rather too sweeping, and does not do justice to the careful investigation of the pathology of the disease that was made in many parts of the world before 1914. Certainly the war gave many pathologists the opportunity of studying malaria, with abundant *post mortem* material, and in Europe, especially, there was the further advantage of access to numerous cases of recently acquired and uncomplicated malaria. In the tropics, a large proportion of the malarial cases that are submitted to *post mortem* examination are complicated by the presence of other diseases; but in spite of this difficulty, the essential features of the pathology of malaria were well worked out by many competent tropical pathologists before the war aroused a more widespread interest in the subject.

H. J. Walton.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 2.

## RELAPSING FEVER AND OTHER SPIROCHAETOSES.

NICOLLE (Charles) & ANDERSON (Charles). Fièvre récurrente transmise à la fois par ornithodores et par poux. [**Relapsing Fever transmitted by both Ticks and Lice.**]—*C.R. Acad. Sci.* 1926. June 14. Vol. 182. No. 24. pp. 1450–1451.

—— & ——. Fièvre récurrente transmise à la fois par ornithodores et par poux. Étude expérimentale de la récurrente espagnole.—*Arch. Inst. Pasteur de Tunis.* 1926. Sept. Vol. 15. No. 3. pp. 197–228. With 7 charts. [9 refs.]

The authors point out that one of them has long believed that relapsing fever transmissible by both ticks and lice would be found to occur. This view arose from the fact that in Tunis epidemics of the disease appeared to commence in the southern districts, from which it spread over the entire country. It did not appear that the conditions of life in the south were suitable for the maintenance of relapsing fever in the inter-epidemic periods if lice alone were responsible for transmission. It was suspected, therefore, that though the epidemic spread was undoubtedly due to lice the maintenance of the disease in the south was due to ticks. The theory was carefully tested by experiments with *Ornithodorus savignyi* which occurs in the south, and the strains of the louse-borne spirochaete. Though the most careful transmission experiments were undertaken it was not found possible to transmit the disease by this tick. The recent discovery by S. DE BUEN of a Spanish relapsing fever transmitted by *Ornithodorus marocanus* has given the authors another opportunity of testing their theory. Infected ticks were obtained and a series of experiments instituted. It was found that the ticks readily infected a guineapig and a monkey by their bites and upon the monkey lice were fed. With these lice it was found possible to convey infection to monkeys by introducing material from crushed lice beneath the skin, on scarified areas of skin and into the conjunctival sac, this being the method by which infection occurs in nature in the case of louse-borne spirochaetosis. In no case did the bite of the louse transmit infection, the earlier work on the mechanism of louse transmission being completely confirmed. It was thus demonstrated that the relapsing fever spirochaete of Spain was transmissible by both ticks and lice. Attempts to transmit the spirochaete by *Ornithodorus savignyi* resulted in infection by injection of crushed ticks but not by the bite. The evidence appears to support the theory that relapsing fever is maintained in endemic form in Spain by *O. marocanus*, and though DE BUEN could obtain no evidence that the disease, as studied by him in Spain, was spread by lice it seems not improbable that, should it assume an epidemic character, this would be due to louse transmission.

As regards the development of the Spanish spirochaete in lice confirmation of the earlier work was obtained. It was noted that the spirochaetes ingested by the lice quickly disappeared from the intestine and though the lice were carefully examined spirochaetes never reappeared in them. The lice, nevertheless, were most infective on the 8th and 9th days after feeding. In the original work with the louse-borne spirochaete it was found that the spirochaetes quickly disappeared but reappeared in the body fluids on the 6th to the 8th days. It was noted that the lice were most infective at the moment of reappearance of spirochaetes or just before this. This fact and that of the failure of the Spanish spirochaete to reappear in the lice, which were, nevertheless, infective, is an indication that infection is always due to the introduction of invisible forms of the organism. The failure of the Spanish spirochaete to reappear is thought to be due to the fact that it was less adapted to development in the louse than the one habitually transmitted by this insect.

The authors describe in detail the infections produced in monkeys, mice, rats, guineapigs and rabbits by the Spanish spirochaete. The general tendency is for these animals to show a severe relapsing type of infection differing from that produced by the louse-borne spirochaete of N. Africa, which produces few, if any, relapses and a less severe infection. The Spanish tick-borne spirochaete thus resembles the tick-borne spirochaete *T. duttoni* of Africa in its behaviour in experimental animals. In human beings, as described by DE BUEN, the Spanish relapsing fever resembles the African tick fever rather than the louse-borne disease.

As regards the specificity of the tick-borne spirochaete of Spain the authors state emphatically that in their opinion cross immunity experiments should not be used as a basis of distinguishing species of the relapsing fever organisms.

It seems to the authors that their theory has received definite support from the experiments detailed above, and they still think that the relapsing fever of Tunisia will be found to be maintained in the south by ticks. They see in relapsing fever a disease originally tick-borne, the spirochaete of which, becoming adapted to life in the louse, has accordingly spread over the world wherever these insects occur. A disease originally endemic in character has thus become a world wide epidemic owing to its acquired transmissibility by lice which are carried by human beings wherever they go.

C. M. Wenyon.

STRONG (Richard P.). **Spirochaetal Infections of Man.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 218–239. [6 refs.]

The paper is mainly a general review of the state of knowledge regarding the various human spirochaetal infections. One condition not hitherto recognized is, however, described. This is a granulomatous dermal form of spirochaetosis classified with syphilis and yaws in the infective granulomata. The disease as observed in a patient in the

Amazon Valley is a chronic one and confined to the feet. A condition simulating this one was described by THOMAS in Manaos in 1910 and BREINL in Australia in 1911. In neither of these cases was a histological study made nor was the cause ascertained, though THOMAS reported its transmission into the nose of a rabbit and stated that the condition appeared to be infective keratosis. In one case from the Amazon Valley the lesions bore a superficial resemblance to epithelioma but on closer examination they were seen to consist of closely-packed individual papillomata forming confluent patches of granulomatous tissue which ulcerated and then healed with the production of a large amount of scar tissue. When some of the tissue is removed and moist preparations made from the cut surface are examined with the dark-field a picture like that of relapsing fever blood is seen. In stained films, however, the spirochaetes are more numerous than they ever are in relapsing fever and appear coarser and larger. Fusiform bacilli were not seen. Attempts were made to infect monkeys subcutaneously and rabbits by injection of material into the testicle. In the case of the rabbits a central area of necrosis developed and in it were found an occasional coarse spirochaete with a few cocci and bacilli. Histologically the human lesion showed marked hyperplasia of the epidermis and areas of acute, subacute and chronic inflammation. The spirochaete which is regarded as the cause of the infection is named *Spirochaeta noguchii.*

C. M. W.

CAFFREY (P. J.). **Relapsing Fever in Northern Nigeria, some Observations.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. June 17. Vol. 20. No. 3. pp. 195–197. With 1 chart.

The author describes his experiences with relapsing fever in the Sokotu Province. The outbreak followed very closely the advent of the dry, cool season when the average temperature was 70°–80° F., and the average humidity 50–60. A chart shows the mortality rate for twelve months and indicates a marked increase during the months when the rain was nil. The peak of the curve was in March. Amongst a population of 273,000 the excessive mortality rate of 53·4 per 1,000 was due entirely to this disease. All the evidence available pointed to the disease being louse-borne, spirochaetes being found in 4 out of 60 of these insects examined.

As regards symptomatology, in addition to the fever, marked signs of dyspnoea, jaundice and enlargement of the spleen occurred. The dyspnoea gave the impression of an approaching pneumonia. Jaundice was apparent on the second day of illness as a conjunctival tinge which gradually deepened to a definite staining by the sixth day. Old cases which had had one or more relapses sometimes showed well-marked jaundice. The spleen was enlarged and tender during the febrile period, but it was not possible to exclude concurrent malaria. In untreated cases the initial fever lasted for 6 to 8 days. After an apyrexial period a relapse occurred about the 13th to the 15th day. The relapse lasted 3 or 4 days and was often followed by irregular relapses during the next 2 months. Novarsenobillon in a dose of 0·3 gm. for children and twice this for an adult male caused early disappearance of the spirochaetes. Of 192 cases treated only 2, in moribund condition when seen, died. The mortality amongst unattended cases was 35 per cent. Stabilarsan intravenously gave satisfactory results, which, however, were not so good as those observed with novarsenobillon. Stovarsol by the mouth was less satisfactory.

C. M. W.

SAMSONOV (P. S.). **Persian Relapsing Fever in Central Asia.**—*Jl. Med. de l'Asie Centrale.* Tashkent. 1926. Vol. 5. No. 5. English summary p. 328. [In Russian pp. 249–264. With 9 text figs. 15 refs.]

The Persian type of relapsing fever which is associated with the presence of *Ornithodorus tholozani* occurs also in Central Asia. It is noted in Tadjikistan (the eastern part of the former Bokhara) by TROITSKY, in Zerafshan (the northern part of Bokhara) by KOROVNIKOV, and in Fergana and Tashkent by KONAHOV and the author. The disease is usually of a mild type characterized by numerous short relapses. The disease is alway sporadic and occurs amongst Europeans during July, August and September.

C. M. W.

ZAMORANO (A.). [La fiebre recurrente en la provincia de Toledo.] [**Relapsing Fever in Toledo.**]—*La Medicina Ibera.* 1926. Jan. 9. [Summarized in *Rev. Española de Med. y Cirug.* Barcelona. 1926. Mar. Vol. 9. No. 93. pp. 146–148.]

This is an analysis of six cases of relapsing fever in four of which there was a definite history of tick-bites 5–7 days previous to the onset. The remaining two patients did not recollect being actually bitten, but their occupation was to look after pigs whose styes were infested with ticks. The author is in favour of the view that the disease is primarily one of pigs because the tick transmitting the fever is a common parasite of the pig, and only exceptionally attacks man, while there exists among swine a disease called murrain (morriña), the course of which is very similar to that of relapsing fever in man. All the patients under the observation of the author recovered spontaneously.

H. Harold Scott.

MORIN (A.) & GENEVRAY (J.). Présence en Nouvelle-Calédonie de *Spirillum morsus muris* et de *Spirochaeta recurrentis.* [**Presence in New Caledonia of** *S. morsus muris* **and** *S. recurrentis.*]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 529–532. With 1 chart.

The paper describes a case of rat-bite fever in a child three years of age in which the spirillum was discovered by gland puncture and a febrile disease in a woman 40 years of age which was due to spirochaetes of the relapsing fever type. An interesting feature of the latter case is that the illness, which lasted seven days, was not followed by any relapse. As malaria does not occur in New Caledonia it is suggested that certain undiagnosed febrile conditions of intermittent form may be cases of relapsing fever. They sometimes occur in epidemics, and have been long known to local practitioners who have few facilities for making the necessary microscopic examinations.

C. M. W.

JOSEPH (A.). Untersuchungen ueber den Antagonismus parasitologischer Infektionen in der Immunitätsperiode. [**The Antagonism of Parasitic Infections in the Immunity Period.**]—*Klin. Woch.* 1926. Aug. 6. Vol. 5. No. 32. pp. 1466–1467. [1 ref.]

TRAUTMANN (*Ann. Inst. Pasteur* 1907. Vol. 21, pp. 808–24) and, later, DAELS (*Arch. f. Hyg.* 1910. Vol. 72, pp. 257–306) showed that there existed a certain antagonism between trypanosome and spirochaete infections as exemplified by the milder course of a nagana infection in animals suffering from experimental relapsing fever. It occurred to the author that the spirochaetes which persist in the brain after animals have recovered from a relapsing fever infection might be affected by a subsequent inoculation of trypanosomes. Accordingly a number of rats which had recovered from a spirochaetal infection were inoculated with nagana trypanosomes, and when this infection had developed they were cured by means of tartar emetic, which has no influence on the spirochaetes. It was found that when the brain substance was inoculated into fresh rats they became infected with spirochaetes, so that it was evident that the trypanosomes had not affected the brain spirochaetes. It was further shown that animals which had been cured of a trypanosome infection responded to relapsing fever in the usual manner. Whether the results are comparable with those obtained in the treatment of general paralysis with malaria seems doubtful, though by the operation of brain puncture FÖRSTER has demonstrated spirochaetes in the brain of general paralytics after treatment. In any case, it would seem that the superimposed infection does not directly influence the production of immune substances against the persisting organisms. There may be a non-specific stimulation of the depressed antibody producing mechanism or, as many maintain, a damage to the brain blood vessels which permits of the entry of immune substances or drugs.

C. M. W.

PRIGGE (R.). Ueber experimentelle Recurrensinfektion des Kaninchens. [**Experimental Relapsing Fever in the Rabbit.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1926. Sept. 11. Vol. 106. No. 3. pp. 552–555. With 1 text fig. [3 refs.]

Though it is known that injection of rabbits with the spirochaete of relapsing fever will give rise to a transitory infection associated with the development of immune bodies, no one appears to have succeeded in handing on the infection from rabbit to rabbit. The author has attempted to do this with four strains of spirochaetes—two Russian strains and two African strains, one of which was a so-called arsenic-resistant strain. The three first strains produced in a small percentage of animals a characteristic infection, but failed to do so in the majority, though the presence of spirochaetes could sometimes be demonstrated by inoculation of the blood into mice. With the arsenic-resistant strain, however, infections could be readily produced, by intravenous or intratesticular injection of mouse blood rich in spirochaetes. Immediately after intravenous injection spirochaetes could be found in the blood. Later they diminished in number, but a definite increase was noted in 24 hours. In two days as many as ten occurred in each microscopic field. There was no elevation of temperature but a certain number of rabbits died on the third day. The kidneys of these animals showed an acute nephritis; the urine in the bladder was of a dark brownish red colour due to haemoglobin, very few red blood corpuscles being present. In most cases spirochaetes disappeared from the blood in three days. This took place suddenly, in one animal numerous spirochaetes having been seen at one moment and none twenty minutes later. A similar course of events followed intratesticular injection. In no case was relapse noted, though the persistence of spirochaetes was demonstrated for as long as 12 days by the injection of blood or organs into mice. After recovery the rabbits had a definite immunity, the serum being rich in antibodies, as was easily demonstrated by protection experiments with mice. It was possible to hand on the infection from rabbit to rabbit, but the decrease in virulence of the strain resulted in only six direct passages being made. Subcutaneous injection produced no infection, but intracutaneous injection gave rise to a local swelling the fluid from which was infective to mice for 14 days. Such an infection was not followed by the appearance of spirochaetes in the blood nor was any immunity developed. The skin infection could not be handed on from animal to animal.

C. M. W.

PLAUT (F.). Untersuchungen über die Sonderstellung des Nervensystems zur Spirochäteninfektion. Rekurrensinfektion des Nervensystems bei dem als rekurrensimmun geltenden Kaninchen. [**Relapsing Fever Infection of the Nervous System in the Reputed-Immune Rabbit.**]—*Muench. Med. Woch.* 1926. Sept. 17. Vol. 73. No. 38. pp. 1552–1555. [11 refs.]

Rabbits, which are as a rule refractory to the usual methods of inoculation with relapsing fever spirochaetes, can be infected by suboccipital injection. This leads to a primary localization of the spirochaetes in the brain and the development of meningitis. The organisms can be demonstrated in the cerebrospinal fluid and may pass into the blood. The infection, however, may be limited to the nervous system. If the organs (brain, liver, spleen, blood, cerebrospinal fluid) of such an animal are inoculated into mice only those animals inoculated with the brain become infected. If rabbits are inoculated intraperitoneally with the spirochaetes the organisms may enter the brain, and there remain without producing any change in the cerebrospinal fluid. In such cases the brain alone is infective to mice. It thus appears that, though the rabbit is naturally immune to relapsing fever, the brain does not participate in this immunity, and is excluded and separated from other organs in its behaviour towards relapsing fever infection.

C. M. W.

KRANTZ (Walther). Die Rieckenbergsche Reaktion bei experimentellem Mäuserekurrens. [**The Rieckenberg Reaction in Experimental Relapsing Fever in Mice.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Vol. 48. No. 2–3. pp. 207–217. [6 refs.]

The paper describes experiments on the Rieckenberg reaction in the case of relapsing fever spirochaetes. BRUSSIN (this *Bulletin,* Vol. 23, p. 113) was the first to demonstrate that this reaction occurred in the case of these organisms, and the author has confirmed his results. He has found that under the action of the specific serum the platelets adhere to the spirochaetes only if they are still alive; and that the antibody is not developed by the injection of dead spirochaetes but only after an actual infection. The serum preserves its specific properties for a long time, so that there is a possibility of employing such a stock serum for controlling the constancy of the strain of spirochaete after many passages. A further point is that blood platelets from a normal animal may be employed as effectively as those from the infected animal, while it has been shown that bacteria behave in the same way as platelets. It becomes evident therefore that the specific serum renders the spirochaetes sticky, so that objects which are merely indicators easily adhere to them. When once the adhesion has occurred, the reaction cannot be repeated with the same spirochaetes, though as regards their vitality they are uninfluenced by the specific serum. The serum which separates from blood allowed to coagulate is as active as the blood plasma.

C. M. W.

WIECHMANN (Ernst) & HORSTER (Hermann). Studien ueber experimentelle Infektionskrankheiten. I. Mitteilung. Ueber das Serumeiweissbild bei der experimentellen Rekurrensinfektion der Ratte. (Ausgeführt mit Unterstützung der Rockefeller Foundation.) [**The Serum Albumin in Experimental Relapsing Fever in Rats.**]—*Deut. Arch. f. Klin. Med.* 1926. June. Vol. 151. Nos. 5–6. pp. 285–292. With 1 curve. [21 refs.]

Having noted that at the crisis of a relapsing fever infection in rats the red blood corpuscles are agglutinated as well as the spirochaetes, it occurred to the author that this might be associated with a change in the albumin and globulin concentration of the blood. During the period between the inoculation and the appearance of spirochaetes in the blood there is a fall in the albumin concentration followed by a rise. Immediately before the crisis of an infection there is a fall in the albumin. As regards the globulin this is increased up to the crisis, a fall being noted on the first day after the infection. The maximum is reached about eight to twelve hours before agglutination of spirochaetes occurs. It seems probable that the two phenomena are correlated.

C. M. W.

STEINER (G.), HENNING & STEINFELD. Experimentelle Untersuchungen zur Pathologie und Therapie der Spirochätenkrankheiten. IV. Ueber das Verhalten der Recurrensspirochäten in der Haut des Normal- und des Immuntieres. [**The Behaviour of Relapsing Fever Spirochaetes in the Skin of Normal and Immune Animals.**]—*Klin. Woch.* 1926. Aug. 27. Vol. 5. No. 35. pp. 1599–1601. [3 refs.]

With a view to obtaining light on the wandering capacity of spirochaetes in the tissues of the skin, the authors removed pieces of skin from rats, inoculated relapsing fever spirochaetes into the interior of these pieces, and replaced them. Though granulation tissue formed at the site of the operation, the animals became infected, as proved by the appearance of spirochaetes in the blood. If immune rats were used, no such migration of the spirochaetes occurred.

C. M. W.

ARISTOWSKY (W.) & HOELTZER (R.). Ueber die Pathogenität unserer Kulturen der *Spiroch. Obermeieri.* [**Pathogenicity of Cultures of** *S. obermeieri*.]—*Klin. Woch.* 1926. Oct. 22. Vol. 5. No. 43. pp. 2024–2026.

The authors have already described their method of cultivating relapsing fever spirochaetes (this *Bulletin,* Vol. 22, p. 712). They now record certain experiments undertaken to test the pathogenicity of these cultures. It was found that the injection into mice of large doses would give rise to a mild infection which could not be handed on to other mice in series. An opportunity offered of testing the infectivity of cultures on general paralytics. Three cases were inoculated with a strain which had been maintained in culture since its isolation on March 18th, 1924. This was done at the beginning of 1926 with cultures which had been subcultured 296, 306 and 337 times. One case was inoculated with a strain isolated on November 25th, 1925, at its 29th subculture. All these became infected, the minimum dose being 0·2 cc. of a two days old culture. C. M. W.

KROÓ (H.). Zur Frage der Persistenz der Spirochäten bei experimenteller Rekurrens. [**Persistence of Spirochaetes in Experimental Relapsing Fever.**]—*Deut. Med. Woch.* 1926. Aug. 13. Vol. 52. No. 33. pp. 1375–1376.

The author returns to the question of the persistence of spirochaetes in the brain of animals recovered from experimental relapsing fever infections. He shows that the brain may still harbour spirochaetes as long as 90 days after apparent recovery. No one has yet been able to demonstrate persistence of spirochaetes in the blood for such a period, though EHRLICH gave 30 days as the average time that blood remained infective to animals and the author notes an instance in which a relapse occurred with the appearance of spirochaetes in the blood after 50 days. It appears, therefore, justifiable to conclude that immunity to further infection lasts only so long as spirochaetes persist in the brain. Though PRIGGE maintains that the circulating blood must contain spirochaetes if they are present in the brain the evidence does not support this view. Eleven rats were treated with salvarsan for infection either before or after the crisis in such a way that during 37 days they received at 4-day intervals 10 injections of the drug. Four weeks after the last dose the animals were bled and the brain of each injected into three and the blood into two mice. After an incubation period of three to four days six of the brain-injected mice were infected while all the others remained free. The author thinks there is justification for the view that the brain acts separately from the rest of the body as regards the infection, immunity and chemotherapeutic biology of relapsing fever.

C. M. W.

SCHREUS (H. Th.) & WEISBECKER (H.). Zur Frage der sterilisierenden Wirkung von Salvarsan auf die Rekurrensinfektion der Maus. [**The Sterilizing Action of Salvarsan on Relapsing Fever in Mice.**]—*Deut. Med. Woch.* 1926. Nov. 5. Vol. 52. No. 45. pp. 1902–1903. [6 refs.]

Clinical experience in the treatment of syphilis has shown that the result varies between a complete cure, when reinfection is possible, and absolute resistance to salvarsan. Experiments made by BUSCHKE and Kroó and others have shown that relapsing fever mice when treated with salvarsan and apparently cured may still harbour spirochaetes in the brain. The authors decided to investigate the persistence of spirochaetes in the brain and other organs after varying doses of salvarsan, as it appeared that this might throw light on the treatment of syphilis. Accordingly the following procedure was adopted. On the second day of a relapsing fever infection mice were given a dose of silver salvarsan and after 6 or 7 days some of them were killed and inoculations of the brain, liver, aorta and blood were made into other mice. These were observed for 20 days and, whether the blood had shown spirochaetes or not, they were then reinoculated, together with the treated mice which had not been killed and which acted as controls, with relapsing fever virus to test their immunity. The results were as follows. With a dose of 1 cc. of a 1 in 500 solution the brain, liver, aorta and blood were infective to mice which on reinoculation after 20 days were all immune. With a dose of 1·25 cc. the brain and liver alone produced a recognizable infection, but all the reinoculated mice remained uninfected, even those which had shown no infection after inoculation from the blood and aorta of the treated mice. When the dose was increased to 1·5 cc. the brain alone produced infection in the inoculated mice, which on reinoculation became infected in the case of those which had been inoculated from the aorta and blood, but not in the case of those inoculated from the brain and liver. The experiment repeated with a dose of 1·5 cc. and 2 cc. showed that all the organs were sterile while on reinoculation all the mice became infected. The control mice reinoculated after treatment did not become infected except in the case of those which had received the highest dose of 2 cc., an indication that a complete sterilization had occurred and consequently no immunity. The experiments indicate that as the dosage is increased the spirochaetes are eradicated from more organs till finally they are extirpated even from the brain and when such a complete clearing of the system has occurred reinfection is possible.

C. M. W.

Johannessohn (Fritz). Recurrensspirochäten und Salvarsan. [**Relapsing Fever Spirochaetes and Salvarsan.**]—*Med. Klin.* 1926. Oct. 15. Vol. 22. No. 42 (1140). p. 1614. [4 refs.]

Buschke and Kroó stated that when mice were treated for experimental relapsing fever infection with salvarsan though the spirochaetes disappeared from the blood they could be demonstrated in the brain by inoculation of its substance into mice. It did not appear to the author that the statements regarding disappearance from the blood were justified, as the blood had not been tested by inoculation into mice. The author has reinvestigated the question and has inoculated into mice both the blood and brain tissues of the treated animals. He arrives at the following conclusions.

1. If mice are treated with full therapeutic doses of neosalvarsan (3·5 mgm.) immediately after infection occurs there is complete sterilization of both the blood and brain.
2. If treatment is delayed so that spirochaetes have had time to become distributed throughout the body then treatment will sterilize the blood but not the brain.
3. The spirochaetes which persist in the brain are not salvarsan-fast.

C. M. W.

KRANTZ (Walther). Die Sanocrysinwirkung bei Mäuserecurrens. [**Sanocrysin in Relapsing Fever in Mice.**]—*Klin. Woch.* 1926. Sept. 24. Vol. 5. No. 39. p. 1831.

Experiments on the action of sanocrysin on experimental relapsing fever in mice has revealed the fact that it is very similar to that of salvarsan. If a mouse at the early stage of its infection is given a dose (0·0005 to 0·001 gram) of the drug the spirochaetes disappear from the blood, the attack is cut short and relapses do not appear. As in the case of salvarsan, there is no apparent immediate action on the spirochaetes, the disappearance commencing only after some hours. Nevertheless, by inoculation of animals with the spirochaetes taken from the treated animal during the latent period it is found that they have been profoundly altered, the produced infection diminishing in intensity and the incubation period lengthening with approach to the time of disappearance of the organisms. Spirochaetes taken from the animal just before the disappearance crisis commences may fail to produce infection. As regards its prophylactic action, mice inoculated ten minutes after a dose of 0·001 gram of the drug has been given are not protected against infection, though this dose is sufficient to cure an already existing infection. If an hour is allowed to elapse then the resulting infection is less intense, but with an interval of 24 hours no protective action could be detected. As the author remarks, it is of considerable interest that two such different substances as sanocrysin and salvarsan should be so similar in their chemotherapeutic properties.

C. M. W.

VINZENT (René). Sur un spirochète de la souris blanche pathogène pour l'homme. [**A Spirochaete of the White Mouse Pathogenic to Man.**]—*C.R. Soc. Biol.* 1926. July 2. Vol. 95. No. 23. pp. 286–288.

During the course of therapeutic investigations in France with a strain of *Trypanosoma somaliense* in mice, it was noted that in one white mouse a spirochaete of the relapsing fever type had appeared. By keeping blood serum for 2 or 3 days or crushed spleen on ice for 24 hours it was found that the trypanosomes died off and a pure strain of the spirochaete was obtained. This was readily inoculable to mice and young rats, but not to adult rats, guineapigs, rabbits or fowls. The spirochaetes appeared in the blood in 3 days and reached a maximum development on the 6th day, after which they disappeared to return from time to time finally vanishing at about the 21st day. The organism was inoculated to a human being in the last stages of general paralysis. It appeared in the blood in 6 days and remained there for 72 hours, after which it disappeared. Reference is made to LEGER'S discovery of *Spirochaeta crocidurae* in the shrew and rat, and to an observation of SAVINI (this *Bulletin*, Vol. 20, p. 701) who, during the course of passage of a strain of *Trypanosoma brucei* through a series of white mice, had noted the spontaneous appearance of a similar spirochaete which he named *Spirochaeta naganophila*. SAVINI did not, however, subinoculate the organism. In the case of the organism met with by the author the presence of the spirochaete influenced the course of the trypanosome infection in that the death of the animals was considerably retarded.

C. M. W.

MATHIS (Constant). Virulence pour l'homme du spirochète de la musaraigne. [**Virulence for Man of the Shrew Spirochaete.**]—*C. R. Acad. Sci.* 1926. Oct. 4. Vol. 183. No. 14. pp. 574–576.

In 1917 LEGER discovered in the Senegal shrew a spirochaete, *S. crociduræ,* which resembled that of relapsing fever, and it was suggested that the animal might prove to be a reservoir for the human virus. LEGER attempted to infect two human beings by inoculation of blood from infected animals, but though fever was induced, no spirochaetes could be discovered in the blood. The present writer has similarly inoculated two general paralytics in France with blood from mice which had been infected with *S. crocidurae* brought from Dakar in young rabbits. In both cases an infection of an irregular relapsing fever type was induced, but spirochaetes were never demonstrable by direct blood examination. They were, however, recovered by inoculation of mice at various stages of the illness when fever was present. It has thus been demonstrated that a naturally occurring spirochaetosis of animals is capable of transmission to man. Whether this is an indication that the rodents are reservoirs of a human relapsing fever virus, or of a virus which may at some future date lead to human infection, cannot be decided without further work. It is, however, worthy of note that there occur in West Africa, and especially in Senegal, certain febrile conditions of unknown etiology and in which the most careful blood examinations have yielded only negative results. It is possible that animal inoculations might reveal a hitherto undetected spirochaetosis.

C. M. W.

MATHIS (C.) & GALLOWAY (I. A.). Culture *in vitro* du spirochète de la musaraigne. [**Cultivation of the Shrew Spirochaete.**]—*C. R. Soc. Biol.* 1926. Oct. 22. Vol. 95. No. 29. pp. 978–979. [5 refs.]

By the culture method elaborated by one of the authors (this *Bulletin,* Vol. 23, p. 111) *Spirochaete crocidurae* has been successfully cultivated and carried through a number of subcultures. Animals were infected with a sixth passage culture on the 12th day of growth. The behaviour of the organism in the culture medium still further emphasizes its resemblance to the spirochaetes of relapsing fever.

C. M. W.

COLES (Alfred C.). **Leptospira: Methods of Examination: New Habitat of Free-Living Forms.**—*Jl. Trop. Med. & Hyg.* 1926. June 15. Vol. 29. No. 12. pp. 170–176. [16 refs.]

In this paper the author describes in detail his methods of examination of water and other material for leptospira and the results he has obtained. His long experience has enabled him to evolve a technique which gives him uniformly satisfactory results which demonstrate that in expert hands comparatively simple apparatus, such as the oil lamp, may be employed to reveal the finest structure of these minute and delicate organisms. In a review it is impossible to mention the numerous details to which attention must be paid if good results are to be obtained. One of the most important points is the use o absolutely clean slides, to obtain which a pot of paste made with whiting (pulv. creta prep.) and water is kept. This is rubbed on the slide, which is then polished with a clean cloth. With such grease-proof slides exceedingly thin films of water or other material can be made. Liquid on such slides can be conveniently examined with a dry lens system, without a cover glass. The organisms in dry films are stained by Giemsa stain or a modified Fontana stain (described in the paper) or they are shown in relief by the use of a strong or saturated solution of nigrosin in place of indian ink. Leptospira have been demonstrated in water, material from decaying leaves and the kidneys of rats and dogs, the last-named having succumbed to infectious jaundice. As regards the minute structure the author states that the leptospira, in common with nearly all spirochaetes, have at one or both ends long flagellum-like structures. In the case of *S. buccalis* not only are the end flagella present, but also a number of short delicate cilium-like projections along both sides, so that the whole spirochaete has somewhat the appearance of a miniature centipede. Whether other observers will agree with all the statements or not, there can be no doubt that the claims made are the result of painstaking researches. The whole paper is one which well repays a careful study.

C. M. W.

DELAMARE (G.) & ACHITOUV. Indices de courbure et coefficients d'homogénéité des spirochètes fécaux. [**Curves and Coefficients of Faecal and Bronchial Spirochaetes.**]—*C. R. Soc. Biol.* 1926. June 18. Vol. 95. No. 21. pp. 63–65. With 4 text figs.

—— & ——. Indices de courbure et coefficients d'homogénéité des spirochètes bronchiques.—*Ibid.* pp. 65–67. With 2 text figs.

By a careful measurement of intestinal spirochaetes with special reference to the height and length of the curves, which were plotted in various ways on charts, it appears to the authors that there are two types, the one (*buccalis-eurygyrata*) with open spirals, and the other (*dentium-stenogyrata*) with close spirals. The method adopted demonstrates the identity of the spirals of the first type with those of *Spirochaeta buccalis*, without, however, demonstrating that *ipso facto* the two species are identical.

Applying the same method to the spirochaetes of the bronchi, it is concluded that the morphological index of FROILANO DE MELLO cannot be used as an argument against the view that the broncho-pulmonary spirochaetes are of the type of those associated with fusiform bacilli or as establishing the autonomy of *Spirochaeta bronchialis*.

C. M. W.

CASTELLANI (Aldo). **Broncho-Spirochaetosis.**—*Jl. Trop. Med. & Hyg.* 1926. Nov. 1. Vol. 29. No. 21. pp. 360–367. With 5 text figs. [94 refs.]

This paper is a general description of broncho-spirochaetosis and gives a clear account of the author's views on the subject. The name is said to cover, *sensu lato,* " all bronchial and broncho-pulmonary conditions associated with the presence of a large number of spirochaetes in the sputum, which are, in all probability, the causative agents." As regards the spirochaetes, the author says that they may be of very different morphological appearances and he gives a classification of the types which may be found. These are regarded as belonging to the genus *Spirochaeta sensu stricto,* the members of which present a few spirals or coils of different sizes or to the genus *Treponema* in which they have numerous small equal undulations close together. In the first group are included very delicate organisms, such as *Spirochaeta bronchialis* and *minuta* and coarser ones, like *S. buccalis, S. vincenti,* etc. In the second group are *Treponema pallidum,* the cases harbouring which give a positive Wassermann reaction, and other members of this genus associated with which the Wassermann reaction is negative.

It is noted that the spirochaetes seldom occur alone, accompanying streptococci, pneumococci, fusiform bacilli and an organism termed by the author and CHALMERS " macro-vibrio " being found associated with them. The types of the disease are acute broncho-spirochaetosis and chronic broncho-spirochaetosis, the latter divisible into ; (1) type with muco-haemorrhagic or muco-purulent haemorrhagic sputum ; (2) type with purulent expectoration ; (3) type with putrid expectoration. As a modification of the chronic type is the asthmatic type, the symptoms being those of chronic bronchitis with occasional attacks of typical asthma. Cases of mixed infections with tuberculosis or bronchomycosis also occur. Two typical cases of the disease are described in detail, as also the appearance of the lungs as seen at the autopsies of three cases of the purulent type. There was a patchy consolidation of both lungs, and in two of the cases there were several small foci of necrosis. The mucosa of the bronchi was swollen and injected and some of the peribronchial glands were enlarged. In suitably stained sections large numbers of spirochaetes were seen, but it is noted that other organisms were also present. Diagnosis rests upon the discovery of the spirochaete in the fresh sputum. Prognosis is said to be good except in the severe putrid and purulent types, but the disease runs a chronic course, and although periods of great improvement may take place, a true spontaneous cure is exceedingly rare. Three drugs, viz., arsenic, tartar emetic and potassium iodide, have been found useful.

The paper can be regarded as a summary of the present knowledge of the condition broncho-spirochaetosis. It is evident that it is regarded as resulting from infection not only with the organism referred to as *Spirochaeta bronchialis,* but other allied spirochaetes also, some at any rate of which are common inhabitants of the mouth. Under prophylaxis it is stated that mouth hygiene is of importance, as some of the spirochaetes causing the condition are probably always present in the mouth. On commencing to read this paper by the one who had originally described the condition there was a hope that some convincing evidence of the actual pathogenicity of the organisms regarded as causing the disease would be found. But these hopes have not been realized, for the presence of spirochaetes, admittedly of various types, and frequently associated with other bacteria, some of which are known to be harmful, is still the only evidence of their pathogenicity. It does not seem to the reviewer that the problems of etiology will ever reach solution if there exists this continued neglect of the scientific postulates first clearly enunciated by KOCH, which still remain the only certain criteria upon which organisms can be judged to be pathogenic and the cause of any particular disease condition.

C. M. W.

PEYROT (J.). Quelques considérations sur la bronchite de Castellani. Infection générale et son traitement. [**Castellani's Bronchitis. General Infection and its Treatment.**]—*Rev. Prat. Malad. des Pays Chauds.* 1926. Apr. Year 5. Vol. 6. No. 2. pp. 53–91. [24 refs.]

The paper is a long argument in favour of the recognition of bronchial spirochaetosis as a distinct disease. It is based on the author's experience of over forty cases, twenty-four of which occurred in epidemic form during the cold period at the beginning of 1924, as a result of admission to hospital of an infected individual. The initial symptoms of these cases were carefully studied and are described in detail. They appear to be very similar, if not identical in most instances, with those of coryza of varying intensity. Though almost every conceivable pathological condition of the air passages and lungs has already been attributed to the bronchial spirochaetes, these do not complete the morbid conditions for which these organisms are responsible, for the author now notes that other organs may be affected. The liver is described as being tender and hypertrophied, the intestines are irritated so that diarrhoea results, there is a sub-icteric tinting of the conjunctivae, the urine gives the reaction of Hay, the skin shows a generalized eruption, haematuria associated with the presence of spirochaetes in the urine may supervene, the nervous system is involved, so that a condition of depression associated with obsessions and severe frontal headache supervenes, there is swelling and pain in the joints. Such an array of symptoms indicates, as the author says, that bronchial spirochaetosis is not such a mild disease as many observers imagine and demands the careful consideration of the physician. In the treatment of his cases the author has found no specific remedy, the medicaments which have cured one case failing entirely to influence another. He is inclined to admit that the spirochaetes and fusiform bacilli from the bronchi may be identical with those of Vincent's angina, but he is emphatic in his conclusion that in these spirochaetes is to be found the etiological factor of the world-wide morbid conditions he and others have described. It is evident that the symptoms associated with this so-called infection are by no means exhausted, and the trend of the literature on the subject is such that we may confidently expect that many more pathological conditions of the human body will be ascribed to these easily discovered spirochaetes. Unfortunately, there is a missing link in the chain of evidence—the proof that the spirochaetes are responsible for the conditions attributed to them has not been obtained.

C. M. W.

JOHNSON (W. B.). **Notes upon Bronchial Spirochaetosis in the Northern Provinces of Nigeria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. pp. 100–103.

With a view to estimating the prevalence of bronchial spirochaetosis in Nigeria the sputa of patients attending the Native Hospital at Kaduna were examined. This revealed the presence of spirochaetes in a large proportion of those examined. A difficulty encountered in making a diagnosis of bronchial spirochaetosis was that spirochaetes were found in all cases of acute respiratory disease admitted to hospital. Cases of acute bronchitis, pneumonia, pleurisy, asthma and pulmonary tuberculosis which showed spirochaetes in the sputum followed the normal courses of these diseases. The cases of acute bronchitis might readily be diagnosed as acute bronchial spirochaetosis were they not compared with other acute respiratory diseases showing spirochaetes in the sputum. Of 147 sputa examined 107 showed the presence of spirochaetes. It is nevertheless concluded that these organisms may become pathogenic and cause a chronic tracheitis and bronchitis associated with cough and wasting and giving rise to a condition which might readily be mistaken for pulmonary tuberculosis.

C. M. W.

HUIZENGA (L. S.). **Broncho-Spirochaetosis.**—*China Med. Jl.* 1926. July. Vol. 40. No. 7. pp. 658–660. With 1 text fig.

The author states that bronchial spirochaetosis as a distinct disease entity occurs commonly along the lower Yangtse river. As tuberculosis is also common in this locality the two diseases often occur together. The same remark applies to leprosy. Acute cases which run a febrile course are very liable to become chronic if untreated. The chronic uncomplicated cases suffer little disturbance apart from the cough, which is invariably worse in the spring time. To intravenous arsenic treatment most cases respond.

C. M. W.

DELAMARE (G.). Sur la distribution géographique des spirochétoses respiratoires, d'après quelques travaux récents. [**The Geographical Distribution of the Respiratory Spirochaetes.**]—*Bull. Soc. Path. Exot.* 1926. May 12. Vol. 19. No. 5. pp. 322–325.

Recent contributions to the subject of bronchial spirochaetosis, though they may be interpreted as indicating the importance of the pathogenicity of the bronchial spirochaetes or the final abandonment of the view that they are pathogenic, or the importance of exercising caution when a diagnosis of bronchial spirochaetosis is made, do at least indicate that *Spirochaeta bronchialis* is ubiquitous, and that it is impossible to differentiate it from *S. vincenti.*

C. M. W.

LESSLAR (J. E.) & KANAGARAYER (K.). **Three Cases of Bronchial Spirochaetosis.**—*Indian Med. Gaz.* 1926. Sept. Vol. 61. No. 9. pp. 447–448. [3 refs.]

The three cases described showed spirochaetes and fusiform bacilli in their sputa.

C. M. W.

BERNASCONI (Vicente E.). Primer caso de fiebre recurrente autóctono diagnosticado en Jujuy. [**First Case of Relapsing Fever diagnosed in N. Argentina.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 74–76. With 1 coloured plate & 1 chart.

The paper gives an account of a case of typical relapsing fever which occurred in Jujuy, Northern Argentine. A coloured plate depicts the spirochaetes found in the blood.

C. M. W.

## RAT-BITE FEVER.

SOLOMON (H. C.), BERK (A.), THEILER (M.) & CLAY (C. L.). **The Use of Sodoku in the Treatment of General Paralysis. A Preliminary Report.**—*Arch. Intern. Med.* 1926. Sept. 15. Vol. 38. No. 3. pp. 391–404. With 3 charts in text. [15 refs.]

The spirillum of rat-bite fever being an organism which produces a relapsing type of fever in man and one which is easily maintained in laboratory animals, it occurred to the authors that an intentionally-produced infection might be of value in the treatment of general paralysis either in place of the parasite of malaria or in addition to it. In the first place, the infectivity of the animal-maintained strain had to be demonstrated. Accordingly 3 general paralytics were inoculated intradermally in the thigh. In the course of 3 to 5 days redness and swelling occurred at the site of inoculation and there developed a chancre-like sore. The lymphatics became reddened and moderately tender, while the inguinal glands were tender and enlarged. About three days after the development of the sore attacks of fever occurred, the temperature rising to 102° to 104° or 105° F. It remained elevated for a few hours or a couple of days and then descended. Subsequently, rises occurred at intervals varying from a day to 3 or 4 days. A number of attacks occurred during a period of weeks, after which the fever ceased spontaneously or as a result of arsphenamine treatment. During the fever the lymph glands in various parts of the body became enlarged and at the same time skin lesions appeared. The disease was easily controlled by one or more injections of arsphenamine. With the object of avoiding the primary skin lesion which follows intradermic inoculation 8 patients were inoculated intravenously with infected rat or guineapig blood (from 0·1 to 1 cc.). It was found that infection took place and that if care was exercised not to contaminate the skin the primary skin lesion was avoided. At the end of one to three weeks fever occurred. Later, skin manifestations appeared, while at times there was a generalized glandular enlargement. Two cases were infected after they had been subjected to malaria treatment, while in one patient malaria was successfully inoculated after infection with the rat-bite fever organism. It is evident, therefore, that the rat-bite fever virus can be successfully inoculated before or after malaria. Even when animals inoculated from the cases failed to acquire an infection, as is not infrequently the case, it could be recognized that infection had occurred by the development of antibodies in the blood as tested against the living organism from experimental animals. The serum very rapidly caused cessation of movement and lysis of the spirilla. As regards the results of treating general paralytics by the method outlined above the authors are very guarded in their statements but feel that they are justified in claiming that clinical and serological improvement has taken place in some of them. They wish to call attention to the possibilities of the method in producing fever which can be used under circumstances similar to those in which the malaria or relapsing fever methods have been advocated.

C. M. Wenyon.

i. HERZFELD (Gertrude M. A.) & MACKIE (T. J.). **An Investigation of a Case of Rat-Bite Fever.**—*Edinburgh Med. Jl.* 1926. Oct. Vol. 33. No. 10. pp. 606–619. With 6 text figs. [16 refs.]

ii. MACKIE (T. J.) & MCDERMOTT (E. N.) **Bacteriological and Experimental Observations on a Case of Rat-Bite Fever**: *Spirillum minus.* —*Jl. Path. & Bact.* 1926. Oct. Vol. 29. No. 4. pp. 493–495. [8 refs.]

i. The paper describes a typical case of rat-bite fever seen at Edinburgh in a child of five years, which is of special interest in that blood culture yielded an organism with some resemblance to that described by BLAKE as *Streptothrix muris ratti*, and which he supposed to be the cause of the disease [this *Bulletin*, Vol. 7, p. 160]. In addition to this organism, *Spirillum minus* after many futile efforts was found in smears of an enlarged gland, and was successfully inoculated to guineapigs. As regards the organism isolated by culture in biological characters it corresponded generally with *Bacillus faecalis alkaligenes.* In cultures incubated for several days there was some resemblance to BLAKE's organism, which, however, was non-motile. It is suggested that the branching described by BLAKE may have been a false branching, and his microphotographs bear this out. Furthermore, the biological characters of BLAKE's organism do not appear to correspond with those of the group recognized as streptothrices, so that its classification as a streptothrix seems hardly justified. The organism isolated from the blood in the case described was agglutinated by the patient's serum in dilutions which indicated a rise in titre with the progress of the disease. The end-titre was 1 in 1,280. It is concluded that the organism represented a secondary blood infection in the case. The spirillum isolated from the gland corresponded with *Spirillum minus,* and a cure was effected by injection of novarsenobillon.

ii. The strain of *Spirillum minus* was handed on to rats, mice and other guineapigs, but failed to infect rabbits. In the guineapig the infection proved fatal. The two guineapigs inoculated from the gland tissues showed spirilla in the blood in 19 and 37 days, and died in 63 and 127 days. The virulence was increased by subinoculation. The guineapigs developed a progressive illness with irregular intermittent pyrexia, marked emaciation and persistence of blood infection. At a certain stage conjunctivitis and keratitis developed and spirilla occurred in the discharge. This condition reached a maximum and then passed off.

C. M. W.

DEMBO (Leon H.), RUH (H. O.), FARGO (Warren C.) & TAYLOR (George R.). **Rat Bite Fever. A Clinical Review with Report of a Case.**—*Amer. Jl. Dis. Children.* 1925. Feb. Vol. 29. No. 2. pp. 182–190. With 1 chart in text. [24 refs.]

A description of a case of rat-bite fever in a child seven months old. The causative organism was discovered in serum obtained from the bitten region of the thumb. A review of the literature shows that a comparatively small number of cases have been described in America during the past ten years. The clinical condition appears to have been first recognized in America by WILCOX in 1840 (*Amer. Jl. Med. Sci.* Vol. 26, p. 245).

C. M. W.

SOESILO (R.). Het voorkomen van *Spirillum minus* var. *morsus muris*, verwekker van de rattebeetziekte, bij ratten van Batavia. [**On the Occurrence of** *Spirillum minus* **var.** *morsus muris*, **the Cause of Rat-Bite Disease, in Rats found in Batavia.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 4. pp. 522–530. With 1 plate. [17 refs.]

The author, who became acquainted with the technique of the investigation of the causative agent of sodoku in SCHÜFFNER'S laboratory in Amsterdam, applied this knowledge when returning to Java in the search for infected rats in Batavia. Out of 10 *Rattus norvegicus* and 20 *R. rattus*, one of the latter was found infected. He succeeded in transmitting the organism (found in the blood) to white mice and guineapigs. He describes the technique used and the morphology of the organism and confirms the results of previous researches.

N. H. Swellengrebel.

RUYS (A. Ch.). [De verwekker der rattebeetziekte.] [**The Agent of Rat-Bite Fever.**]—Thèse Amsterdam. 1925. [Summarized in *Bull. Inst. Pasteur.* 1926. May 31. Vol. 24. No. 10. pp. 450–451.]

A spirillum resembling that of rat-bite fever was found in the blood of 3 out of 250 rats examined in Amsterdam. They were not found in the saliva. A similar organism was found in mice. Though the organism found in rats and in rat-bite fever is morphologically identical with that in mice the two are regarded as distinct because the former is pathogenic to guineapigs and monkeys, while the latter is not pathogenic to guineapigs. The mouse organism is easily inoculated from mouse to mouse, but does not give rise to any symptoms ; it produces only an abortive infection in rats. The rat strain is as easily inoculated to mice. Guineapigs can be infected by subcutaneous and intraperitoneal inoculation and also by the bites of rats. In the case of bites there is swelling of the bitten limb, glandular enlargement, fever, alopecia and conjunctivitis or keratitis. A wild rat bitten by an infected rat also acquired an infection. The blood of a monkey infected by subcutaneous inoculation was still infectious to mice after 10 days. Rabbits did not respond to inoculation. The strain from an English case of rat-bite fever was pathogenic to the guineapig and monkey and produced in them the same symptoms as the rat strain. On several occasions workers in the laboratory were bitten by mice infected with the three strains without developing any symptoms.

C. M. W.

ABE (M.). **On the Reinoculation of Rat-Bite Disease in Rabbits.**—*Japan. Jl. Dermat. & Urol.* 1926. May, June. Vol. 26. No. 5, 6. English summary pp. 37–38. [In Japanese pp. 510–513.]

Rabbits, which invariably become infected after inoculation with the organism of rat-bite fever, were inoculated intracutaneously and at varying intervals were similarly reinoculated at some other part of the body. It was noted that the probability of the second inoculation producing a lesion was lessened as the interval between the two inoculations was increased. The interval was lowest in those cases in which the primary inoculation produced a marked inflammatory lesion, and as the intensity of the primary lesion varied with the site chosen the interval was dependent on this factor also. In only one of 55 rabbits reinoculated after complete disappearance of the primary lesions was a lesion produced.

C. M. W.

BRODIN (P.) & DE LA RIVIÈRE (Dujaric). Septicémie à virus filtrante consécutive à une morsure de rat, guérie par un abcès de fixation.—**[A Filtrable Virus Septicaemia following a Rat Bite.]**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. June 17. 3rd Ser. Year 42. Vol. 50. No. 21. pp. 985–991. With 2 charts in text.

The authors describe what they regard as an entirely new disease condition resulting from the bite of a white rat which had had been bred in the house. The illness, which ran a course of over two months, commenced three days after the bite, and was not associated with any change in the primary lesion, which had healed completely. The condition was a very severe one, and was characterized by continued but irregular fever, very severe generalized arthritis, acute pharyngitis and laryngitis and a peculiar skin eruption of a papular type, which broke out on the forearms, hands, legs and feet. Appropriate treatments for rheumatic, spirochaetal, intestinal and blood infections were tried without avail. Finally a fixation abscess induced by an injection of turpentine is stated to have brought the illness to an abrupt conclusion. Numerous laboratory examinations were made, but these failed to assist in the diagnosis. It was, however, observed that the serum of the patient passed through a Chamberland L 2 filter produced a fatal infection of a septicaemic type in mice and guineapigs. Cultures were made from the blood, and though no recognizable organisms appeared, subcultures were made and were proved by animal inoculations still to contain the virus. The filtered culture fluids were likewise lethal to animals, so that the authors conclude that they were dealing with a condition caused by a hitherto unrecognized filterable virus.

C. M. W.

SINCLAIR (T. W.). **Probable Case of Rat Bite Fever.**—*Med. Jl. Australia.* 1926. July 24. 13th Year. Vol. 2. No. 4. pp. 111–112.

The case described is that of a man aged 37 who developed fever, glandular swelling and a cutaneous eruption after having been bitten by a rat. As a single dose of novarsenobillon cured the patient the condition is supposed to be rat-bite fever.

C. M. W.

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MARZINOWSKI (E. I.), PIROGOW (A. W.) & MOSCHKOWSKI (Sch. D.). Ein Fall von Rattenbisskrankheit (Sodoku).—*Russian Jl. Trop. Med.* 1926. No. 1. German summary p. 27. [In Russian pp. 3–8. With 1 text fig. 11 refs.]

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## INFECTIOUS JAUNDICE.

WHITEHEAD (N. T.) & CROUCH (H. A.). **Infectious Jaundice in the Sudan.**—*Jl. Trop. Med. & Hyg.* 1926. Nov. 1. Vol. 29. No. 21. pp. 359–360.

The paper describes three separate outbreaks of infectious jaundice which occurred in the Sudan during the years 1922–1925. They bore no relation to one another, and did not conform to any one type of the disease. The Port Sudan epidemic comprised 47 cases and occurred during the first three months of 1922. The chief symptoms were jaundice, headache, epigastric pain, some vomiting after food and slight fever for a day or two. In most cases the urine was examined and was found to be free from albumin. The jaundice disappeared in 5 or 6 days, while the average stay in hospital was 4 days. There appeared to be no debility during convalescence. As men alone suffered from the condition it was evidently not a family disease, and it seemed possible that infection occurred in the market place where the native males congregated daily to take their meals. Laboratory work, including blood culture and inoculation of guineapigs with blood and the deposit from centrifuged urine did not assist in clearing up the diagnosis. In the deposit of the urine of one case spirochaetes were seen, but these did not infect guineapigs. Clinically, there was a resemblance to cases of camp jaundice. The mildness of the attacks, absence of haemorrhagic symptoms, liver enlargement and albuminuria, and lack of pathogenicity of the urine deposit to guineapigs differentiated the disease from infectious jaundice.

The second outbreak occurred in Kassala in February and March, 1924, and affected 10 men of a party of 40 Berberines and a British inspector who lived under canvas by the railway upon which they were working. Laboratory work was not undertaken, but clinically the cases resembled those of the first outbreak. The third epidemic concerned 5 cases which were noted during March to May, 1925, in Malakal. They were quite unconnected with one another, but the symptoms were more severe than in the other two outbreaks. The liver was enlarged, while albumin occurred in traces in the urine of three of the cases. Two developed bronchitis and one cardiac enlargement which proved fatal.

C. M. Wenyon.

BARKER (F. A.). **Leptospirosis. With Special Reference to the Existence of** *Spirochaetosis icterohaemorrhagica,* **or Weil's Disease, in the Andaman Islands.**—*Indian Med. Gaz.* 1926. Oct. Vol. 61. No.10. pp. 479–488. With 8 charts & 1 map. [31 refs.]

This paper, being an M.D. thesis on the subject of leptospira infections, commences by giving a summary of present knowledge regarding the diseases produced by these organisms, and then continues with a discussion of the possibility of the existence of Weil's disease in India. It is not known whether the disease actually occurs in India, though several small epidemics of a suspiciously similar disease have been reported from time to time. This is particularly true of the Andaman Islands, and special attention is paid by the author to the outbreaks of infectious jaundice in this locality. So far, however, the leptospira has not been isolated from the cases, so that though there is every probability that the disease will ultimately prove to be Weil's disease, it has not yet been demonstrated. There is evidently a wide field for enquiry in the Andamans and the rest of India.

C. M. W.

VAN GELDER (A. H.). Nog eenige gevallen van de ziekte van Weil. [**Some more Cases of Weil's Disease.**]—*Nederl. Tijdschr. v. Geneesk.* 1926. July 31. 70th Year. 2nd Half. No. 5. pp. 524–532. With 3 text figs.

During the summer of 1925 the author observed a small epidemic of 8 cases of Weil's disease in the town of Delft (Province of South Holland). They were of medium severity and mild ones; no death occurred. Four of the cases showed the usual clinical symptoms.

The four others were only recognized in connexion with other indubitable cases. In all the diagnosis was confirmed by the agglutination and lysis of leptospira by the patient's serum in a dilution of 1 : 1,000 or more. Only once leptospira were found (in the urine).

N. H. Swellengrebel.

CREYX & BONNEL. Remarques sur l'ictère infectieux. [**Remarks on Infectious Jaundice.**—*C.R. Soc. Biol.* 1926. May 28. Vol. 94. No. 18. pp. 1287–1288.

In describing a case of febrile jaundice of a relapsing type the author calls attention to the present tendency to regard all such cases as of the nature of infectious jaundice if a positive serological reaction is obtained with the leptospira of Weil's disease. This is true even of cases in which blood culture has revealed organisms of the typhoid group. The case in point was negative to all tests but the serological one, and the remark is made that from the point of view of etiology the diagnosis was based on the single laboratory reaction, namely, the agglutination of *Spirochaeta icterohaemorrhagiae* by the patient's serum.

C. M. W.

UHLENHUTH & GROSSMANN (H.). Die Ätiologie und Epidemiologie der ansteckenden Gelbsucht (Weilschen Krankheit) im Lichte experimenteller Untersuchungen ueber die Typenfrage ihres Erregers (*Spirochaeta icterogenes*). [**Aetiology and Epidemiology of Infectious Jaundice. Experimental Researches on the Type of the Spirochaete.**]—*Klin. Woch.* 1926. June 18 & 25. Vol. 5. Nos. 25 & 26. pp. 1113–1117. [1 ref.]; 1163–1166.

In these papers the authors discuss the etiology of Weil's disease, reviewing all known facts regarding the incidence of the disease in man and the experimental data obtained in the laboratory. It is noted that the human disease is always localized and is generally connected in some way with polluted waters. The infection in rats, however, is world-wide in its distribution. It is known that organisms indistinguishable from those isolated from human beings and rats occur in water and that occasionally they have been found to produce in guineapigs inoculated experimentally symptoms like those caused by the Weil's disease organism. It is accordingly suggested that there exist in water two distinct though morphologically indistinguishable organisms, the one a true non-pathogenic type and the other the actual organism of Weil's disease. Rats, which have frequent opportunities of becoming infected from water, readily develop into carriers and are thus more often infected than human beings. The rats, however, play little, if any, part in the etiology of the human disease which is acquired by man, in the same way as rats but more rarely, from polluted waters. The authors believe that this view affords the best explanation of the known facts regarding the etiology of the infection of man.

In the second paper there is given a record of a series of experiments designed to test this theory. Pure cultures of a series of strains of leptospira isolated from human beings, rats and water were injected into rabbits and homologous immune sera prepared. It was found that the organisms would grow readily in a medium made by diluting inactivated serum with tap water. Using the immune sera any one organism would grow in any serum but its own homologous serum.

In this manner it was found that serologically distinct strains of human, rat and water leptospira exist. Four strains from cases of Weil's disease in Holland all agreed with one another in growing in each other's homologous serum, though they were definitely distinct from a German strain. Furthermore, it was found that of two rat strains one was closely related to one of the human strains and the other not so. It has already been shown by UHLENHUTH & ZUELZER that a water strain grown for a year in rabbit serum so changed that it had become serologically identical with a true Weil strain, while ZUELZER had demonstrated that such a water strain had become pathogenic to guineapigs. It is evident that under certain conditions changes can take place, and it is suggested that such a change might occur in the tissues of the rat. Proof of this, however, was not obtained. Assuming that rats ingest various serological types of water leptospira, as seems very probable, it would be expected that differences would occur in the organisms isolated from rats. As a matter of fact, it is known that the tissues of rats known to harbour leptospira do not always produce infection in guineapigs, and it is possible that in cases in which infection does not occur it is due to the organisms having been derived from non-pathogenic water strains. Two water strains were, however, found to grow well in the serum of rats known to be infected with leptospira.

As a result of these experiments, only a few of which have been mentioned here, it is concluded that the variability in the serological reactions of human strains, and presumably also of the rat strains, is best accounted for on the assumption of a definite correlation with the serological variability of water strains.

C. M. W.

ADAMSKI. Weilsche Krankheit. Bemerkungen zu der Arbeit von Uhlenhut in Jg. 5, Nr. 25, S.1113 u. Nr. 26, S.1163 dieser Wochenschrift. [**Weil's Disease. Remarks on Uhlenhuth's Papers** (See above).]—*Klin. Woch.* 1926. Aug. 27. Vol. 5. No. 35. p. 1615.

In the light of the remarks made by UHLENHUTH and GROSSMANN, whose paper is reviewed above, the author calls attention to the case of a human laboratory infection with leptospira isolated from rats and already described by him (this *Bulletin*, Vol. 23, p. 605).

C. M. W.

PETTIT (Auguste). La sérothérapie des spirochétoses ictéro-hémorrhagiques et de la poliomyélite. [**The Serotherapy of Spirochaetosis Icterohaemorrhagica.**]—*Progrès Méd.* 1926. Feb. 20. No. 8. pp. 279–289.

This paper deals, firstly, with the serum therapy of *Leptospira icterohaemorrhagiae* infections in man. The author points out that before the organism was cultivated he prepared a serum by injecting horses with the tissues of infected animals. This procedure produced a serum specific to the spirochaetes, but though it was abandoned when it was possible to inject pure cultures of the organism in place of the infected tissues the experience gained suggested the possibility of producing specific sera in the cases of unknown organisms. By the application of this method the antipoliomyelitis serum described in the second part of the paper was made.

As regards the antispirochaetal serum, its use in France is limited, for in most of the cases the disease is of such a mild nature that serum therapy is unnecessary. Medical men are, however, agreed that in severe cases its use is indicated, for though it does not cut short the fever or influence the jaundice, it benefits the patient in that his general condition is improved, the elimination of the spirochaetes is accelerated and convalescence, so slow in cases which have not had the treatment, is hastened. The dosage is 60 cc. daily for 3 to 5 days in the case of a man weighing 70 kilograms. In France mortality from the infection is only 5 per cent., while in Japan it is reported to be as high as 95 per cent. It is suggested by the author that this discrepancy is due to the fact that the Japanese figure refers to cases seen in the year of discovery of the organism, when it may be conjectured that only the severe typical cases were recognized. C. M. W.

ISHIZU (Yoshitada). Ueber das Blutbild und die haematopoetischen Organe (Milz, Knochenmark) bei der experimentellen *Spirochätosis ictero-haemorrhagica* (Weilschen Krankheit). [**The Blood Picture and Haematopoietic Organs in Experimental Weil's Disease.**]—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1925. Vol. 4. pp. 255–258.

The blood picture of experimental Weil's disease in guineapigs is that of a leucocytosis, the number of cells being from 1·2 to 2·5 times the normal. There is an absolute and relative pseudoeosinophilia and lymphopenia, and a reduction or disappearance of eosinophile leucocytes. The pseudoeosinophile cells are actually increased to twice or three times the normal number and reach a figure of 70 to 80 per cent. compared with the normal 30 to 50 per cent.

In the spleen the follicle cells are scanty and those present are irregularly arranged and vacuolated and at times show pycnotic nuclei. A remarkable feature is the occurrence of erythrophagocytes in the sinus lumens. The bone marrow shows a marked augmentation of the megakaryocytes and a definite reduction of the pseudoeosinophile leucocytes. The bulk of the marrow parenchyma is made up of pseudoeosinophile myelocytes and normoblasts, so that pathologically, the bone marrow assumes the characters of the red myelotic-erythroblastic marrow of Naegeli.

The rest of the paper is occupied with a discussion of the relationship of these findings to one another and their bearing on the pathology of the disease and the changes which occur when a cure is brought about by the use of specific serum. As controls the blood, spleen and bone marrow of normal guineapigs injected with other sera were examined.

C. M. W.

PAGNIEZ (Ph.). Au sujet d'une réaction colorée spéciale des urines au cours de la spirochétose ictérigène. [**On a Special Colour Reaction of the Urine in Infectious Jaundice.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. June 3. Year 42. 3rd Ser. Vol. 50. No. 19. pp. 858–859. [1 ref.]

In an earlier paper the author, in collaboration with other workers, drew attention to a reaction of the urine in cases of *Leptospira icterohaemorrhagiae* infections.* During the height of the jaundice, between the first and eighth days of the disease, the urine is heavily charged with

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*PAGNIEZ (Ph.), CAYREL (A.), LÉVY (P. P.) & DE LÉOBARDY (J.). Étude clinique de 45 cas de spirochétose ictérigène.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. p. 1181.

bile pigments. The addition of one or two drops of acetic acid to a few cubic centimeters of urine, and heating, as in the well-known albumin test, causes the acidified part of the urine to assume a green colour which may be very intense. The colouration may occur even without heating. It appears to be due to oxidation of the bile pigments which occurs readily in this particular disease, but not in other forms of jaundice. The author again draws attention to the reaction, as he has found it very marked in the case of young man who recently contracted the disease after contact with the mud of the Marne, during a bathing expedition.

C. M. W.

TAGAWA (Sentaro). [**On So-called Sakushyu-Fever. Communication 1.**] —*Okayama Igakkwai Zasshi.* (*Jl. Okayama Med. Soc.*) 1925. Aug. No. 427. [Summarized in *Japan Med. World.* 1926. Apr. 15. Vol. 6. No. 4. p. 95.]

Sakushyu fever is an epidemic disease occurring in a certain district of Okayama and is clinically very similar to spirochaetosis haemorrhagiae or Weil's disease. Immunological experiments were carried out by the author. He injected mixtures of the spirochaetes of Weil's disease and those of seven-day fever with the serum of the patients into animals; the results were inconclusive, some being positive, others negative.

P. W. Bassett-Smith.

SOESILO (R.). [Vergelijkende studie van enkele pathogene leptospirenstammen en leptospiren, afkomstig van de rattenbevolking van Amsterdam en omgeving.] [**Comparative Work on Pathogenic and Rat Strains of Leptospira at Amsterdam.**]—Thèse. Amsterdam. 1925. [Summarized in *Bull. Inst. Pasteur.* 1926. May 31. Vol. 24. No. 10. p. 448.]

Nine strains of leptospira isolated from Amsterdam rats were compared serologically with a strain isolated from a case of Weil's disease in Holland. Seven of the rat strains agreed with the human strain but two differed from it, though they agreed with BAERMANN'S strain which had been isolated from febrile spirochaetosis in Sumatra. This discrepancy suggests that in Holland there may be two human diseases, one actual Weil's disease and the other a less severe type of infection like that encountered in Sumatra.

C. M. W.

SAILER (Joseph), with a Bacteriological Note by J. C. SMALL. **Leptospirosis Icterohemorrhagica (Weil's Disease).**—*Amer. Jl. Med. Sci.* 1925. Sept. Vol. 170. No. 3. pp. 332–341. With 1 fig. [21 refs.]

The paper describes two typical cases of Weil's disease in men aged 51 and 44 in Philadelphia. In the first case leptospira were seen by dark-field examination of the blood while from the urine of the second guineapigs were infected. Both cases recovered.

C. M. W.

BURTON-FANNING (F. W.) & CLEVELAND (A. J.). **Spirochaetosis icterohaemorrhagica in Norfolk.**—*Brit. Med. Jl.* 1926. July 17. p. 108. [3 refs.]

A description of four unassociated cases of infectious jaundice, three of which were fatal. The causal organism was found in the urine of one of the cases, but the symptoms of all were so similar that there is little doubt as to the correctness of the diagnosis.

C. M. W.

## YELLOW FEVER.

AITKEN (A. Blair), CONNAL (Andrew), GRAY (G. M.) & SMITH (E. C.). **Yellow Fever in Lagos during 1925. Clinical and Pathological Notes.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. June 17. Vol. 20. No. 3. pp. 166–184. With 12 charts.

An outbreak of yellow fever occurred in Lagos in 1925 and afforded an opportunity of studying the disease. The cases officially reported were 12 in number and of these 7 died. In addition there were 5 cases which were regarded as suspicious. They all recovered. The first 2 cases occurred in members of the crew of a dredger in Lagos harbour. In neither was a definite diagnosis made, but it seems possible that they were the cause of the outbreak. There is no evidence that the disease was introduced; Case 5, however, occurred in a man who had been for 3 weeks in Ibadan (120 miles distant) during which a case of yellow fever was reported. On his return to Lagos he lived in the quarters from which Case 3 had been removed 2 days previously, he himself being removed to hospital 5 days after his return.

The chief features of the various cases are set out in 3 Tables. Cases seen within the first 24 hours presented little which was characteristic of the disease. Vomiting was frequent and severe from the beginning, in the fatal cases as also in those that recovered. The earliest occurrence of " coffee-ground " vomit was on the third day. Backache was a prominent feature in only one case, which recovered. The yellow tint was faint in 2 cases and in the remainder, with one exception, it deepened but little during life. Epigastric tenderness was severe in only 2 cases, which terminated fatally. It was neither severe nor an early symptom in the other cases and could be described as an hepatic tenderness associated with the progressive enlargement of the liver. The urine diminished in amount daily up to almost complete suppression. Albuminuria was a marked feature of all but 2 cases. Convalescence was in all instances relatively slow. This was in marked contrast to the rapid recovery usually seen in the malaria of Lagos.

The carefully conducted laboratory work included blood examinations, cultivation experiments, inoculation of guineapigs, pathological studies, Pfeiffer's reaction and mosquito transmission experiments with *Aëdes argenteus* and guineapigs. The results obtained did not lend support to the view that the cases were caused by malaria, and though no evidence of the presence of leptospira could be obtained, the histopathology and the clinical picture were both those of yellow fever.

C. M. Wenyon.

LAURENT (J. M.). La fièvre jaune dans le golfe du Bénin. [**Yellow Fever in the Gulf of Benin.**]—*Rev. Méd. et Hyg. Trop.* 1926. July-Aug. & Sept.-Oct. Vol. 18. Nos. 4 & 5. pp. 111–121; 129–158. [1 ref.]

A report by SPIRE (this *Bulletin*, Vol. 19, p. 568) on the history of yellow fever in Dahomey having come to the author's notice in 1923, he instituted enquiries regarding the cases diagnosed. As the result of his investigation it is his belief that the deaths which occurred in 1905, 1907, 1913 and 1921–1922 were wrongly attributed to yellow fever. The various official records which he has obtained together with reports from the local medical officers are analysed in detail, and he is convinced that malaria affords a sufficient explanation. He points out that the ictero-haemorrhagic syndrome is not pathognomonic of yellow fever, but is found in all serious icteric conditions, whatever their cause. For instance, in the *Traité de pathologie exotique* of GRALL et CLARAC the following symptoms are attributed to malaria—simple purpura, haemorrhagic purpura, visceral haemorrhages which may end fatally (bleeding from the gums, melaena, haematemesis, haematuria), epistaxis, hepatic manifestations in the form of benign febrile icterus or more serious icterus with elevated temperature, adynamic and sub-delirious state, bilious vomiting and death from cardio-vascular collapse associated with hypothermia and weak pulse. Similarly, Noël FIESSINGER describes serious types of malaria with gastro-intestinal haemorrhage in Macedonia where yellow fever has never been considered. In many cases the diagnosis of yellow fever in Dahomey has been made without sufficient evidence, so that at present Mono is recognized as an endemic centre of the disease, and there is a tendency to ascribe every death to its agency. The author points out that in Grand-Popo, Ouidah and Abomey it is merely the black vomit and a a notion of epidemicity which result in a diagnosis of yellow fever. Thus, of 13 cases diagnosed as such in Grand-Popo in 1905, 6 did not have haemorrhage, 1 had doubtful haemorrhage from the stomach, 4 were not directly observed, while only 2 had a definite ictero-haemorrhagic syndrome. He states that he has practised in Ouidah and Grand-Popo for 10 years and has never heard of or seen cases of black vomit in children.

The chief of the Health Service of Dahomey maintains that yellow fever is admitted to be endemic, that the black races are not absolutely immune, and that during the epidemic period before Europeans are attacked there has been observed amongst the children a type of icteroid fever which can be regarded as an attenuated form of yellow fever. None of the reports, however, mentions such a disease of children, though with reference to the Abomey outbreak of 1912 the physicians do say that they had been told there had been an abnormal mortality amongst the children and young people. The only symptom noted, however, was fever. As a result of his examination of the records and information he has collected regarding the cases, the detailed symptomatology of which is set out in the paper, the author concludes that the diagnosis of yellow fever is unjustified and that in spite of hesitation on the part of the medical officers attending the cases this diagnosis has been officially forced upon them. Furthermore, the available records from Nigeria and the Gold Coast do not lend support to the view that yellow fever is endemic. Though malarial parasites may have been absent from the cases an explanation of this can be found in the quinine which is always taken in increasing doses when there is any indisposition.

The author concludes by asking two questions. If yellow fever is epidemic, whence does it come ? and if it is endemic, why should useless and inconvenient quarantines be established ?

C. M. W.

i. Brau. Rapport sur l'épidémie de fièvre jaune à Toukoto (cercle de Kita, Soudan). [**The Yellow Fever Epidemic at Toukoto.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Apr.–May–June. Vol. 24. No. 2. pp. 169–181.

ii. Abbatucci. Y a-t-il eu des cas de fièvre jaune au Soudan pendant les mois d'octobre-novembre 1925 ? [**Was there Yellow Fever in the Soudan, Oct.-Nov. 1925 ?**]—*Ibid.* pp. 182–185. [2 refs.]

iii. Laurent (J. M.). La fièvre jaune dans le golfe du Bénin. [**Yellow Fever in the Gulf of Benin.**]—*Rev. Méd. et Hyg. Trop.* 1926. Nov.-Dec. Vol. 18. No. 6. pp. 175–176. [1 ref.]

i. & ii. These three papers deal with the outbreak at Toukoto. The author of the first, on the assumption that the disease was yellow fever, describes in detail the energetic prophylactic measures which were put into force and which are regarded as having been effectual in checking the spread of the epidemic, while the author of the second, without deprecating the decision of the authorities in immediately instituting these preventive measures, considers that the facts observed regarding the cases are capable of other interpretations, of which relapsing fever may be one.

iii. The author of the third paper notes that of the nine cases three only were regarded as yellow fever, the others being diagnosed as malaria in spite of the fact that two were fatal and one vomited material of a chocolate colour with black spots. In none of the three cases labelled yellow fever was the icterohaemorrhagic syndrome present, for the word jaundice is not mentioned in their reports. The first case had neither black vomit nor haemorrhage ; the second had coffee-coloured vomit, but this can be attributed to swallowed blood from the severe and continued epistaxis ; the third case also had epistaxis, but vomited once only, and on that occasion material of such a character and quantity that haemorrhage into the stomach can be admitted. The author enquires why under these circumstances should yellow fever be considered when malaria offered a sufficient explanation of the outbreak ? The placing in quarantine of Toukoto was unjustified and led to the removal of all Europeans, at a time when malaria is particularly virulent, to a comfortless camp where two of the victims met their death.

C. M. W.

Suldey (E. W.). La fièvre jaune au Soudan (Toukoto, 1925). [**Yellow Fever in Toukoto, 1925.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 604–613. [3 refs.]

The six cases which occurred in Europeans in Toukoto during October and November, 1925, and were regarded as yellow fever, have already been commented upon by Brau and Abbatucci (this *Bulletin*, Vol. 23, pp. 609, 610). Owing to certain doubts which have been expressed the author of the paper under review has thought that some further details of the outbreak may be of interest, especially as they emphasize the importance of early diagnosis, both clinical and laboratory, from the point of view of the establishment of prophylactic measures. The first case died without any laboratory examinations having been made and yellow fever was not considered. The second case occurred ten days later. The patient had taken no quinine and though the parasites of malignant tertian malaria were found in the blood the clinical picture was sufficiently suggestive to give rise to the suspicion that it was a case of yellow fever complicated with malaria. Accordingly, preparations were made for the most energetic measures of prophylaxis, including inoculation with Noguchi's vaccine. Fourteen days later the third case, in a recent arrival, occurred. This was definitely diagnosed as yellow fever from the clinical pictures and the laboratory findings. The elaborate measures which had been prepared were at once put into operation, all the Europeans, including the children, being inoculated with the vaccine. The fourth case, which was not severe and which, like the third, recovered, occurred after a fortnight's interval. The fifth and sixth cases, which terminated fatally, occurred 8 days after the fourth case. Both had received the protective inoculation, but infection evidently took place within the period necessary for the development of complete immunity. The individuals concerned had not followed the regulations which prohibited wandering about at night. These two cases gave rise to the greatest alarm amongst the population and facilitated the enforcement of the prophylactic regulations, some of which had not hitherto been followed. Soon all danger of further spread was at an end and the quarantine was removed. The great importance of early diagnosis is well illustrated by the history of the outbreak and both clinical and laboratory findings enable other conditions to be excluded. The use of Noguchi's vaccine is considered to have been efficacious in controlling the epidemic. It has to be remembered, however, that the use of the vaccine must not be an excuse for the neglect of anti-mosquito measures. [In the review of ABBATUCCI'S paper (this *Bulletin*, Vol. 23, p. 610) it was erroneously stated that six deaths occurred instead of four.]

C. M. W.

BRAU. Récentes manifestations de fièvre jaune en Afrique occidentale française. [**Recent Manifestations of Yellow Fever in French West Africa.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 645–654. [1 ref.]

This paper is a continuation of that previously reviewed (this *Bulletin*, Vol. 23, p. 609). Attention is again called to the importance of the early diagnosis of yellow fever. The diseases which may give rise to doubt are severe jaundice or yellow fever *nostras*, relapsing fever, haemoglobinuria, malignant malaria, bilious types of typhoid fever, sun stroke and icterohaemorrhagic spirochaetosis. The differential diagnosis of these various conditions is discussed. Attention is called to the uses of Noguchi's vaccine and serum in the prevention and treatment of yellow fever.

C. M. W.

HERNANDEZ BAUTISTA (Dario). La fiebre amarilla de 1923 en Bucaramanga. [**Yellow Fever in Bucaramanga in 1923.**]—*Repert. de Med. y Cirug.* Bogota. 1926. Feb., Mar., Apr., May, June & July. Vol. 17. Nos. 5, 6, 7, 8, 9 & 10. (197, 198 199, 200, 201 & 202.) pp. 267–288; 334–349 [3 refs.]; 398–415 [3 refs.]; 463–475; 510–531; 582–602 [14 refs.].

A part only of this long paper deals directly with the epidemic of yellow fever in Bucaramanga in 1923. The whole is divided into four Parts, each of which has several sections. Part I gives a description of Bucaramanga and its climatology. Part II, the longest, is devoted mainly to yellow fever in general, the biology and cultivation of the Leptospira, the transmission of the virus, the bionomics of the vector, general remarks on the epidemiology of yellow fever and the question of immunity. Dengue and yellow fever are compared.

The epidemic in 1923 is shown to have been due to spread from an endemic focus and not to importation from without, and the epidemic appears on the whole to have been a mild one. In this part also an account is given of the post-mortem findings, which were typical. The serum of convalescents was found to agglutinate cultures of *L. icteroides* and *L. icterohaemorrhagiae* equally, but Pfeiffer's reaction yielded positive results with the former only.

The symptoms of three cases are detailed ; one, an average case, terminating in recovery, the second, a severe case, ending fatally, as did also the third which was complicated by malaria.

Various forms of treatment were adopted, including Sternberg's mixture and haemostatics as perchloride of iron, but the best results were obtained with arsenical preparations, notably neosalvarsan, which many practitioners came to regard as a specific even in severe cases. Prophylaxis was on the usual lines, with the help of a staff sent from the Rockefeller Foundation. The author states that by these means the disease was eradicated in 60 days ; that Bucaramanga is now free from yellow fever and that future outbreaks can only arise from fresh importation. Dengue has also disappeared.

Part III is chiefly statistical, stating the number of houses visited and the number found infested [presumably by *Aëdes aegypti*] between June, 1923 and March, 1924. In the first three months the numbers of infested houses were 1,301, 2,270, and 1,327 respectively. After August the number diminished rapidly, and in the following March was only 27. In this part also are given the rules and regulations laid down as to the duties of those engaged in the campaign.

Part IV is occupied with a narration in detail of several cases of yellow fever and two of dengue.

H. Harold Scott.

HANSON (Henry). **Some Atypical Cases of Yellow Fever in Salvador.** —*Amer. Jl. Trop. Med.* 1926. July. Vol. 6. No. 4. pp. 261–270. With 4 charts. [1 ref.]

The paper describes four cases of what appeared to be atypical yellow fever which occurred during the recent outbreak of this disease in San Salvador. Three of the patients had been vaccinated but fell ill within 14 days after the second inoculation, i.e., before the elapse of the period required for the establishment of immunity. They presented a mild type of the disease. An unvaccinated individual had severe initial symptoms and his illness appeared like a severe first day case of yellow fever with cerebral manifestations, which usually ends fatally. The symptoms rapidly subsided after a full dose of Noguchi anti-yellow-fever serum. All the cases were from the same hotel in the most pronounced focus of infection. None had the characteristic marked albuminuria. Malaria was excluded by blood examinations and absence of enlargement and tenderness of the spleen. All four ended in recovery. Two patients gave a positive-

Pfeiffer reaction and one left the country before the test was made. The patient who had received serum treatment gave a negative reaction, but it was thought that the serum given within 24 hours of the onset of the disease had neutralized the antibody-forming properties. The treatment included what the author regards as the five most important points in dealing with yellow fever patients, viz., complete rest in bed, starvation, catharsis, administration of water, seclusion of the patient.

C. M. W.

TORRES (C. Magarinos). [In Portuguese & English.] Sobre a importancia no diagnostico post-mortem da febre amarella, das lesões microscopicas descriptas por H. da Rocha Lima e por Hoffmann. **On the Importance, in Post-Mortem Diagnosis of Yellow Fever, of the Microscopic Lesions described by Rocha Lima and Hoffmann.**—*Mem. Inst. Oswaldo Cruz.* 1926. Vol. 19. No. 1. In Portuguese pp. 5–11. In English pp. 13–18. With 4 figs. on 1 plate. [6 refs.]

The post-mortem appearances of a case of yellow fever described in the paper were so atypical that from these alone a diagnosis could not have been made. The liver did not show the usual enlargement and colouring while there were haemorrhagic lesions in the lungs which are rarely seen in this disease. Microscopic examination of sections of the liver and kidneys, however, produced convincing evidence that the correct diagnosis had been made. In the liver fatty degeneration unassociated with other lesions occurred round the portal spaces. In the intermediate zone of the lobule there was, in addition to fatty degeneration, cellular necrosis which affected isolated cells of the liver trabeculae. The necrotic cells were reduced in size, were highly eosinophilic and possessed karyolitic or pycnotic nuclei. The kidneys, in addition to the extensive fatty degeneration of the tubular epithelium and the presence of hyaline and haemorrhagic casts, revealed the calcified casts first described by HOFFMANN. These appear to be formed by an acute process of deposition of lime salts so that the casts stain blue with haematoxylin. The lime casts may occur accidentally in various infectious diseases, but not with any constancy or frequency. They have not been observed in Weil's disease.

C. M. W.

HOFFMANN (W. H.). Das Krankheitsbild des Gelbfiebers. **[The Disease Picture of Yellow Fever.]**—*Deut. Med. Woch.* 1926. Oct. 8. Vol. 52. No. 41. pp. 1729–1732. [1 ref.]

Yellow fever is a disease with septic haemorrhagic characters resulting from infection with *Leptospira icteroides* which, by means of its toxin, damages chiefly the parenchymatous organs, the blood vessels and the blood. The acute degeneration of the liver and kidney cells and particularly those of the heart muscle often brings about a rapidly fatal issue. The degeneration of the vessel walls causes multiple haemorrhages which find their most severe expression in the haemorrhagic vomit. The destruction of red blood corpuscles and the subsequent absorption of haemoglobin is the cause of jaundice which is of a pure haematogenous type. Fortunately, the very virulent spirochaete poison rapidly brings about the production of protective and curative substances which often result in the disease running a mild course with rapid recovery. The severe cases which occur in endemic areas are correlated with an unusually high virulence of the causative organism. On the other hand, many mild cases occur amongst children in whom the disease may pass unrecognized and last only a few days. It is the rule for such cases to occur where the disease is sporadic and has not yet become generalized. The diagnosis may present great difficulties and be impossible unless the organism can be demonstrated.

C. M. W.

HOFFMANN (W. H.). **Yellow Fever Control in West Africa.**—*Jl. Trop. Med. & Hyg.* 1925. Oct. 15. Vol. 29. No. 20. pp. 349–351.

The author advocates the energetic application to Africa of those methods of yellow fever control which have proved to be so effectual in checking the disease in America.

C. M. W.

## UNDULANT AND ABORTUS FEVERS.

i. Zdrodowski (P.). Sur la charactéristique de la fièvre mediterranéenne en Azerbaidjan. **[Undulant Fever in Azerbaidjan and Baku.]**—*Trav. Inst. Microbiol. et Hyg. d'Azerbaidjan.* Baku. 1925–26. Nos. 2–3. pp. 101–122. [In Russian.]

ii. Ter-Grigoroff (H.). De la diagnose de la fièvre mediterranéenne en Azerbaidjan.—*Ibid.* pp. 123–129.

iii. Brenn (H.) & Amid-Zadé (G.). Recherches sur la fièvre mediterranéenne dans l'abattoir de la ville de Bakou.—*Ibid.* pp. 130–138.

iv. Kolesnikoff (N.). Sur l'anatomie pathologique de la fièvre mediterranéenne expérimentale.—*Ibid.* pp. 139–150.

i. The author summarizes the results of three years' experience with undulant fever in the Caucasus, the first cases of which were observed in Azerbaidjan in 1922. Since that time the disease has been found to be prevalent in nearly all parts of the Caucasus, including the Black Sea Coast. Apart from goats, the source of infection was traced to sheep and their products, and to cattle (including buffaloes).

ii. During the second half of 1925, the author diagnosed eleven cases of undulant fever by serological and bacteriological methods. In the serological test Wright's agglutination reaction was employed, the dilutions varying from 1 : 100 to 1 : 5,000. The results were recorded after 3–4 hours incubation, and again after 24 hours at room temperature. The bacteriological examination was carried out as follows: 10 cc. of blood taken aseptically from the elbow vein were inoculated into two flasks, each containing 100 cc. of neutral broth. These were incubated for several days, care being taken not to shake the flasks, thus allowing the blood clot to suspend from the surface instead of falling to the bottom.

iii. Wright's agglutination test and Bordet-Gengou's reaction of fixation of alexin were used by the authors in the examination of 249 sheep and 82 cows at the Baku slaughter-house. Micrococcus infection was indicated in 5·2 per cent. of the former and in 48· per cent. of the latter. Serological investigation of 120 employees of the slaughter-house pointed to an infection in 5 per cent.

iv. The author records the results of post mortem examination of 12 guineapigs infected *per os* with the Azerbaidjan strain of micrococcus, and killed at periods from one to nine months after inoculation. The pathological anatomy of these cases was as follows :—

1. *Spleen.*—Hypertrophy produced by diffuse and focal proliferation of reticular cells ; productive perisplenitis.
2. *Lymphatics.*—Lymphoid tissue atrophied ; proliferation of reticular tissue ; desquamative, and sometimes haemorrhagic or purulent sinusitis.
3. *Liver.*—Productive perihepatitis ; proliferation of endothelium with formation of tubercles ; degeneration of liver cells.
4. *Lungs.*—Productive inflammation with formation of tubercles, similar to those in tuberculosis ; compensatory emphysema.

Among the minor manifestations are recorded abscesses in the epididymis, absence of spermatozoa in the seminiferous tubules, and cloudy swelling of the epithelium of the convoluted tubules of the kidneys.

C. A. Hoare.

ROZNATOVSKY (J. P.). [La fièvre ondulante dans le Caucase du Nord.] [**Undulant Fever in Northern Caucasus.**]—*Rapport Soc. Méd. Rostov. et Séance conjointe Cons. San. et Epidém. et Assoc. Inst. pour recherches scientif.* 1926. [Summarized in *Bull. Inst. Pasteur.* 1926. Aug. 31. Vol. 24. No. 16. pp. 723–724.]

The presence of undulant fever to the North of the great Caucasian chain of mountains was demonstrated for the first time in November, 1925, by isolation of the specific organism in the blood and urine of a patient giving signs of the fever in the Clinic of the University of Rostov s Don. An epidemiological investigation was made by the author in the village, in the province of Salle, from which the patient came. He examined 45 people; 8 gave a positive agglutination reaction at 1 in 50, 4 at 1 in 100, 3 at 1 in 500, and 1 at 1 in 1,000. Two active cases gave satisfactory results when treated by autohaemotherapy. Positive results were obtained in serum of 4 out of 8 goats, 2 sheep out of 3, and 2 horses out of 3.

The author thinks that the disease was imported from Trans-Caucasus (Kars) in 1922, and is spread by the manufacture of briquettes from the excreta of the horse and sheep, the only fuel.

P. W. Bassett-Smith.

ALESSANDRINI (A.). Sopra un focolaio epidemico di febbre maltese. [**A Small Epidemic of Undulant Fever.**]—*Policlinico.* Sez. Prat. 1926. Sept. 27. Vol. 33. No. 39. pp. 1345–1352. [23 refs.]

This is an account of a small focus of [what was believed to be] undulant fever, the interest of which consists largely in the working out of the origin of the outbreak. In January and February of 1926 in several flocks of goats and sheep there was a high percentage of abortion; in one flock 38 out of 40; in another 14 goats out of 20, and 15 sheep out of 60. It is important to note that no cases occurred among bovines. In the third week of March, M.G., the owner of the first flock, was attacked, and ten days later his wife. The symptoms in the former were high fever and renal complications, which brought about death in 2½ months. In the latter, there were fever, epistaxis, vomiting, metrorrhagia, diarrhoea, and complete anuria for ten consecutive days, death occurring on the 20th day of disease.

During the succeeding three months there were 40 cases, 20 men, 16 women, 4 children. The local practitioner stated that during his 3½ years' residence in the locality he had not seen a case of undulant fever. The serum of the first patient, M.G., agglutinated *M. melitensis* and *B. abortus* in equal titres. Agglutinins were totally removed by heating to 65° C. for half an hour.

Three other cases are particularly mentioned, a man, his wife and his mother-in-law. None of the three kept goats, nor did they drink goats' milk or eat any of the products made from it. All three fell victims, and on enquiry it was found that they had been employed in cleaning the stalls occupied by goats belonging to M.G.

H. Harold Scott.

FINZI (Guido). Sulla eziologia dell'aborto epizootico e sull'origine della febbre maltese nell'uomo. [**The Cause of Contagious Abortion and the Origin of Undulant Fever in Man.**]—*Moderno Zooiatro.* 1926. Sept. 11 & Oct. 9. Year 15. Ser. 5. Nos. 37 & 41. pp. 817–828; 921–932.

This paper offers a good general review of the much-debated question of the causative organisms of undulant fever and contagious abortion. The subject is discussed under the following main headings: Can contagious abortion be considered as a strictly specific disease due in every case to the *B. abortus* of Bang, or are there other organisms closely allied to this, capable of producing the same condition with corresponding pathological changes? Analogously, is undulant fever in man always due to the *M. melitensis*? These are discussed on general lines and no definite conclusion is reached. Next, can *M. melitensis* produce abortion in animals, and why is this organism, the cause of undulant fever in man, pathogenic for some animals, while the *B. abortus* is not pathogenic for man? [To put the matter in so definite a form seems rather to beg the question, for certain authors have recorded human infection by the latter organism.] The author's reply, however, is that it is owing to the frequent cross-transference of the *M. melitensis* from goat to man and man to goat.

The use of abortin, amblosin, and abortoform for the diagnosis of the one, and of melitin for the other, on lines analogous to the tuberculin reaction by intradermal inoculation is mentioned.

The paper ends with a statement of the recommendations for prophylactic treatmnet by biological means: For healthy cows not exposed to immediate risk of contagion 15 cc. of vaccine should be given, followed 8–10 days later by 20 cc., and no access allowed to the bull for another 20 days.

For healthy cows which are exposed to infection 20 cc. of antiserum is injected at the base of the neck on one side and 10 cc. of vaccine on the other. 30–40 days later 10 cc. of vaccine alone is given, and repeated after a like interval. If the cows have already aborted, vaccine in doses of 10, 15, and 20 cc. at 30–40 days' interval is injected in the early months of the next pregnancy. The same procedure may be carried out later, but not in the final month; if any treatment is given then the serum, in a dose of 20 cc., is better.

H. Harold Scott.

CARPENTER (C. M.) & MERRIAM (H. E.). **Undulant Fever from** *Brucella abortus.* **Report of Two Cases.**—*Jl. Amer. Med. Assoc.* 1926. Oct. 16. Vol. 87. No. 16. pp. 1269–1271. With 1 chart in text. [3 refs.]

The authors bring forward again the cases of two students who, while working in the laboratory, contracted an undulant type of fever apparently through infected cows' milk. From the blood of each case an organism was isolated responding to the tests for *Br. abortus*; injected subcutaneously it produced abortion in heifers in their first pregnancies, causing atypical infection of the placenta, and was recovered from that organ and the foetus. The cultures were virulent for guineapigs producing lesions similar to those produced by *Br. abortus.*

These cases appear to show that the bovine form of the organism can give rise to a prolonged infective disease in man and that the specific organism can be recovered from the patient, causing again, when injected into animals, the typical symptoms and lesions of *Br. abortus.* There is, however, a slight doubt whether the milk was the origin of the infection, and therefore the deductions cannot be definitely accepted.

P. W. B-S.

MOORE (V. A.) & CARPENTER (C. M.). **Undulant Fever in Man associated with Bacteria Indistinguishable from** *Brucella abortus.* [Abstract.]—*Amer. Jl. Path.* 1926. Sept. Vol. 2. No. 5 (11). p. 455.

The work of Carpenter and others is reported, and it is stated that so far no case of human abortion has been traced to *Br. abortus.* In the discussion Dr. EWING asked if the glands were infected in these so-called cases of abortus fever and how they could be diagnosed from glandular fever. OLSON pointed out how easily true undulant fever might be disseminated from known foci; 50 cases were known to have occurred in Utah with 6 deaths in the last 16 years. Goat's milk and its products were the infective agents.

P. W. B-S.

GAGE (E. E.) & GREGORY (D. A.). **Human Infection with** *Brucella melitensis* **Variety** *abortus* **treated with Mercurochrome.**—*Jl. Amer. Med. Assoc.* 1926. Sept. 11. Vol. 87. No. 11. pp. 348–349. [4 refs.]

The case reported was that of a white man, aged 33, who in March 1924 complained of chills, pains, fever and sweats. He was treated in hospital during April, but the disease was not diagnosed, though a gram-negative coccus was isolated from the blood, to which later his serum reacted positively. He was readmitted in May when the organism was recognized as *B. abortus,* and the case was diagnosed as abortus fever. He was treated with 0·2 gm. of acroflavin without improvement; but 0·22 gm. of mercurochrome (220), though causing at first a severe reaction with chill, vomiting and bloody diarrhoea, stopped the fever. The patient had been employed in hog killing for six years and this was thought to be the source of the infection, and it is stated that the infectivity of the organism for man must be low.

P. W. B-S.

COURTOIS-SUFFIT, GARNIER & LIÈGE. Un cas de fièvre de Malte guéri à la suite de l'injection unique d'une endoprotéine préparée avec le "*Bacillus abortus*" de Bang. [**Case of Undulant Fever cured by a Single Injection of Endoprotein of** *B. abortus.*]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. July 29. Year 42. 3rd Ser. Vol. 50. No. 27. pp. 1329–1334. With 2 charts in text.

The interest of the case described lies in the apparent local origin of the disease (near Paris), the probable infection from close association with animals (cattle, sheep and goats), rather than infection through food, the clinical course of the fever, the diagnosis not by blood culture, but by a low agglutination titre, and lastly, the rapid improvement after an injection of a large dose of " endoprotein " prepared from culture of *B. abortus*. The cure appeared to be due to " shock " of a non-specific character, but it might have been a specific reaction; if so, it would point to *B. abortus* being the cause of the fever.

In the debate NETTER did not consider that the cure was due to any specific action, but was a simple protein shock.

P. W. B-S.

ROGER (Henri). La spondylite mélitococcique. [**Spondylitis in Undulant Fever.**]—*Presse Méd.* 1926. July 24. Vol. 34. No. 59. pp. 929–930. [4 refs.]

The author gives a description of the various forms of arthritic pains which have been noted in undulant fever. He divides them into: (1) Acute, rarely causing ankylosis or going on to suppuration. (2) Sub-acute, more common, often put down to rheumatism; these may cause organic changes and affect many joints.

When the disease is localized in the vertebral region it gives rise to special forms of spondylitis, slowly evolved and chronic in character, chiefly affecting the lumbar region, then the dorsal, more rarely the cervical. The lumbar pains are most frequent, and may be so severe as to prevent movement, but in almost all cases radiography shows nothing definitely abnormal, thus differentiating the condition from tuberculous or rheumatic arthritis. The cord is not affected, though there may be some meningeal irritation with plus reflexes; there are no secondary muscular changes. The cerebrospinal fluid may show an increase in albumen and a lymphocytosis, but it rarely contains agglutinins. The diagnosis of this melitococcic spondylitis has to be made from those of tuberculous, typhoid and rheumatic origin; this is generally effected by serum tests and radiography, but tuberculous disease may follow on a melitensis infection. The author states that after vaccines have been tried subdural injection of lipiodol should be used.

P. W. B-S.

ZANZUCCHI (A.) & VERCELLANA (G.). Ancora sulla differenziazione del *M. melitense* dal B. di Bang mediante un saggio di agglutinazione aspecifica. Nota IIa. [**Differentiation of** *M. melitensis* **and** *B. abortus* **by Non-Specific Agglutination.**]—*Pathologica.* 1926. Aug. 15. Vol. 18. No. 418. pp. 395–397.

Following up their former paper (see this *Bulletin*, Vol. 23, p. 729), the authors have tested ten more cultures of *B. abortus* from different sources for agglutination with lactic acid. Nine of them were totally negative, the other gave a strong agglutination with 1 : 20 lactic acid, diminishing till 1 : 300 was reached, after which the reaction was negative. He sums up his conclusions as follows: A strain which is agglutinated by lactic acid in dilutions above 1 : 300 is certainly *M. melitensis*; one which is not agglutinated at all, or in low dilutions only, is certainly *B. abortus*.

[These sweeping deductions cannot be accepted until confirmed in other laboratories.—P.W.B-S.]

H. Harold Scott.

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FAVILLI (Giovanni). Di alcune agglutinazioni aspecifiche nei batteri del gruppo abortus-melitensis-paramelitensis. Effetti prodotti sugli stessi batteri dal ripetuto trattamento con sieri immuni. **[Non-Specific Agglutination of the *Brucella* Group of Bacteria. The Effects on these Bacteria of Repeated Action of Immune Sera.]** —*Sperimentale.* 1926. Oct. 25. Vol. 80. No. 4. pp. 395–415. [12 refs.]

The author has repeated the tests of thermo-agglutination of BURNET and the non-specific agglutination of VERCELLANA and ZANZUCCHI with peptone, and finds a strict parallelism between them as regards *M. melitensis, M. paramelitensis* and *B. abortus.* With lactic acid the results were considerably more variable. *Paramelitensis,* it is true, was agglutinated in each instance, but with the other two organisms the results were divergent. With some strains there was a strong agglutination, with others none at all.

The second part of the paper presents some interesting facts: To 10 cc. of a broth culture of *M. melitensis* the author added three drops of a high titre immune serum. Twelve hours later the supernatant fluid was pipetted off and the sediment of agglutinated bacteria placed in fresh broth. After about a dozen such passages the organism no longer was agglutinable, but at the end of the third transference, though previously non-agglutinable with heat, peptone or lactic acid, it became agglutinable. These acquired properties of serum-resistance, but non-specific agglutinability, seemed to be stable; at all events, they were still retained after 36 subcultivations.

By similar treatment the *B. abortus* also took on the characters of *M. paramelitensis,* and in this case, too, they seemed to be stable.

The natural, though hypothetical, inference from the above is that the organism of undulant fever after long stay in the body, a process comparable to repeated subjection to the action of the immune serum, acquires the characters of the *M. paramelitensis.* On these lines also the existence of strains occupying a position intermediate between *melitensis* and *paramelitensis* might be accounted for.

H. Harold Scott.

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TAPIA (M.) & DE NICOLAS (Martin). Sur la différenciation du *Micrococcus melitensis* et du *Bacillus abortus* par l'agglutination. **[Separation of *M. melitensis* and *B. abortus* by Agglutination.]**—*C.R. Soc. Biol.* 1926. July 23. Vol. 95. No. 26. pp. 563–565.

Employing the technique of FICAI and ALESSANDRINI and CASTELLANI, with human, horse, goat, guineapig and rabbit serums, the authors state that they have not been able by agglutination methods to find differences between the anti-sera of the two organisms sufficiently clear to admit of their separation; thus they disagree with the findings of EVANS, KHALED & PALETTINI. With heated sera the

**results were no better ; they state that the differences in the resistance to heat are more dependent on the species of the animal than upon the species of the microbe. These results support the findings of Burnet, that the differences noted are no greater than are often seen in various strains of the same organism.**

P. W. B-S.

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BÉGUET. Sur le mécanisme de l'agglutination (à propos du *Br. melitensis*). [**The Mechanism of Agglutination** (*Br. melitensis*).]—*C.R. Acad. Sci.* 1926. July 26. Vol. 183. No. 4. pp. 323–325.

The author carried out an investigation on 52 strains of *Br. melitensis* and *Br. abortus* to determine the characters which influenced their agglutinability and came to the following conclusions :—

1. The non-specific agglutination of *Br. melitensis* and *Br. abortus* is due to a flocculation of peri- and inter-bacterial substances which has a mechanical action upon the bacteria themselves. These substances are filterable and can be separated. The substances which give the *non-specific agglutinability* are normally absorbed by the bacterial bodies, a slight amount only being found in the centrifuged liquid.

2. The specific agglutination appears to be the result of the flocculation of a substance special to the genus and purely bacterial in origin ; every time that the bacteria are placed in a condition of suspension a certain part passes into the liquid. Animal black (*noir animal*) is able to separate the non-agglutinable substances without affecting the specific. The laws of stability of colloidal solutions are applicable to both specific and non-specific substances. These results support to a great extent the views of CH. NICOLLE and those of BORDET. The phenomenon is complicated by the presence of at least two different flocculable substances.

P. W. B-S.

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CARPENTER (C. M.). **Agglutinins for** *Brucella abortus* **in the Blood of Man.**—*Jl. Infect. Dis.* 1926. Sept. Vol. 39. No. 3. pp. 220–223. [18 refs.]

The evidence that *Br. abortus* is able to produce disease in man has been obtained by isolating the organism from the blood and the specific agglutinins from the serum (GRINSTED & HOLTH). Drinking raw infected milk was believed by NICHOL, PRATT & COOLEDGE to give rise to these agglutinins. EVANS states that she has found evidence of specific immune body in 59 out of 500 patients suffering from other diseases. [In England the reviewer found only 2 out of 100.] The author has studied 20 cases of undiagnosed fevers in New York and was able to cultivate the organism from 5, though in only 3 of these could positive serum agglutinations be obtained. It was found that these agglutinins did not appear in the serum until near the end of the disease, approximately after 2 months. He used Strain 80, a heat-killed antigen, a dilution of 1 in 10 or over after 12 hours incubation. (1 in 10 being positive.)

RESULTS OF AGGLUTINATION TEST OF BLOOD SERUM OF 20 PATIENTS SHOWING SYMPTOMS RESEMBLING THOSE OF UNDULANT FEVER.

| No. of Case. | Diagnosis. | Bacteriological Results. | Agglutination Test with Brucella Abortus.* |
|---|---|---|---|
| 1 | Undulant fever ... ... | Br. abortus ... ... | 480 |
| 2 | Not made ... ... | Staphylococcus albus ... | 0 |
| 3 | Not made ... ... | Negative ... ... ... | 0 |
| 4 | Subacute bacterial endocarditis. | Br. abortus ... ... | 120 |
| 5 | Not made ... ... | Negative ... ... ... | 0 |
| 6 | Not made ... ... | Negative ... ... ... | 0 |
| 7 | Undulant fever ... ... | Br. abortus ... ... | 30 |
| 8 | Typhoid fever ... ... | Br. abortus ; Bact. typhosum. | 0 |
| 9 | Typhoid fever ... ... | Bact. typhosum ... ... | 0 |
| 10 | Typhoid fever ... ... | Negative ... ... ... | 0 |
| 11 | Not made ... ... | Negative ... ... ... | 0 |
| 12 | Subacute bacterial endocarditis. | Streptococcus ... ... | 0 |
| 13 | Not made ... ... | Negative ... ... | 30 |
| 14 | Not made ... ... | Negative ... ... ... | 0 |
| 15 | Undulant fever ... ... | Unidentified Gram-negative rod. | 240 |
| 16 | Syphilis of lymph nodes... | Br. abortus ... ... | 0 |
| 17 | Influenza ... ... | Negative ... ... | 0 |
| 18 | Not made ... ... | Negative ... ... ... | 0 |
| 19 | Acute articular rheumatism. | Negative ... ... ... | 0 |
| 20 | Lagrippe ... ... | Negative ... ... | 0 |

* The figures indicate the highest dilutions of serum producing agglutination ; 0 indicates no agglutination with 1 : 5 dilution.

It is an interesting and important fact that the 5 positive cases were 2 undulant fever, 1 sub-acute endocarditis, 1 typhoid mixed infection and 1 syphilis, the typhoid and syphilis cases having no agglutinins. The author deduces from his observations that the agglutination test cannot be relied upon to detect the presence of *Br. abortus* in man.

[The variability of the antigenic properties of certain strains is rightly emphasized by the author, but the differentiation of the organism from melitensis in these undulant fever cases cannot yet be considered satisfactory.]

P. W. B-S.

DE MARE (N.). Attivazione del potere di agglutinabilità dei batteri del gruppo Tifo, Paratifo, Coli e del Melitense mediante l'influenza della bile. [**Restoration of Agglutinability of Organisms of the Coli-Typhoid Group and of *M. melitensis* by the Action of Bile.**]—*Riv. di Patologia Sperim.* 1926. July–Aug. Vol. 1. No. 4. pp. 266–275. [11 refs.]

The author repeated DOMINGO'S experiments showing that hypo- or non-agglutinable strains of *M. melitensis* became highly agglutinable after contact for 24 hours with ox-bile, 9 parts of the latter to 1 part of culture of the former emulsed in saline. Having confirmed these results, he found that the same held good for other organisms, such as those of the typhoid-paratyphoid-coli group. He then undertook experiments to test what constituent of the bile was responsible for these effects, by employing solutions of the bile-salts, and found that the action was due mostly to the taurocholate and slightly to the glycocholate of sodium, a mixture of the two not summating the effects; the optimum mixture is one with 4 per cent. taurocholate and 3 per cent. of the glycocholate.

DOMINGO suggested that the result was due to washing of the bacilli free of metabolic products which interfere with the action of the agglutinins, but the author concludes that it arises from " increase of the fixation of agglutinins by the bacterial receptors from change in the colloidal state of the organisms, aided by enhanced precipitation of a new bactero-agglutinin complex." Examples are given of this increased agglutinability: thus, an inagglutinable *B. coli*, after treatment with the bile, was agglutinated with 1 : 400, the titre of the immune serum being 1 : 500; a *B. typhosus*, previously agglutinating only at 1 : 50, was raised to 1 : 1200 with a serum of titre 1 : 2,000. He also found that after such subjection to the action of bile or bile-salts the increased agglutinability was retained on subculture for several passages at least.

H. Harold Scott.

FRANCIS (Edward) & EVANS (Alice C.). **Agglutination, Cross-Agglutination, and Agglutinin Absorption in Tularaemia.**—*Public Health Rep.* 1926. June 25. Vol. 41. No. 26. pp. 1273–1295. With 3 charts in text. [1 ref.]

In an elaborate investigation of the serological methods of diagnosis of tularaemia it is stated that " agglutination of a stock culture by the patient's blood serum " is reliable. In 120 cases the titre rose very high after the first week, gradually fell after the eighth, and was not entirely lost even after 18 years. Tularaemic serum of men or

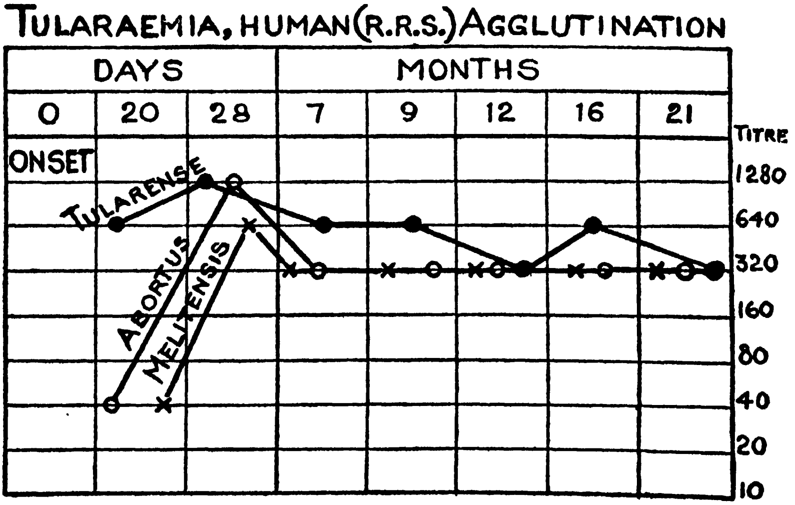

**Chart.**—Showing agglutination of *tularense, abortus,* and *melitensis* to the same, or nearly the same, degree by a human tularaemic serum.

[Reproduced from *Public Health Reports,* Washington.]

animals had no action on the organisms of the enterica group, dysentery, pestis, cocci, or proteus $X_{19}$; and vice-versa, the *B. tularense* is not agglutinated by these different specific sera. It was, however, found that both *B. melitensis* and *abortus* at times gave high titre reactions, rendering the elimination of this group most important in differential diagnosis of all but the most definite clinical and endemic cases of tularaemia. The parallelism of the reaction as shown in the charts is very evident. From 100 human specific sera cross agglutination with *melitensis* and *abortus* sera was seen in 37, 3 of which showed the same titre for all three organisms. The absorption experiments gave very interesting results :—

(1) *B. tularense* was readily differentiated from *B. abortus* and *melitensis.*

(2) *B. abortus* was (generally) readily differentiated from *B. melitensis.*

(3) Tularense serum differentiated *abortus* from *melitensis,* reacting as an abortus serum.

With ordinary agglutination tests a serum giving very marked differences of titre between tularense or *abortus* and *melitensis* can usually be classed as due to the organism with the highest titre, but in all cases where there is a very similar degree of agglutination the organism should be subjected to absorption tests.

The paper is very full of detail, with accurate descriptions of the technique used, and contains many tables and charts. It should be read in the original by those interested in the subject.

P. W. B-S.

CARPENTER (C. M.). **A Comparison of Strains of** *Brucella abortus* **isolated from Man with those from Cattle.**—*Jl. Infect. Dis.* 1926. Sept. Vol. 39. No. 3. pp. 215–219. [10 refs.]

The author compares the characters of 5 strains of *Br. abortus* isolated by him from the blood and urine of men, with strains recovered from bovine sources. The chief points studied were the atmospheric requirements on isolation, serological relationship, pathogenicity to guineapigs, effects on pregnant cattle and ability to grow in the udders of the cattle. The identity of the organisms isolated was established by agglutinin absorption tests, checked by comparison with known strains and serums. The cultures isolated from men could not be differentiated serologically from those of cattle, but growth was more difficult to initiate. These human strains also were highly virulent to guineapigs, but not more so than some bovine strains. The 5 human strains injected intravenously into heifers induced abortion in these animals, the organism was recovered from the milk and foetus, and it was present in the udder of one of the affected animals for 6½ months. The human strains induced abortion in the animals earlier than is usual with bovine ones.

[From this we might infer that passage through man of the *Br. abortus* increases the pathogenicity of the organism for bovines, but independant confirmation of these findings is required before accepting this deduction.]

P. W. B-S.

CERRUTTI (C.). [A proposito di un saggio di agglutinazione aspecifica per la differenziazione del *M. melitensis* dal b. di Bang.] [**An Aspecific Agglutination Test for the Differentiation of** *M. melitensis* **from** *B. abortus.*]—*Giorn. d. Batter. e Immunol.* 1926. Aug. Vol. 1. No. 8. [Summarized in *Bull. Inst. Pasteur.* 1926. Oct. 15. Vol. 24. No. 19. p. 833.]

The author investigated the reliability of the lactic acid flocculation method of VERCELLANA & ZANZUCCHI for the differentiation of *Br. melitensis* from *abortus.* He was unable to accept their deduction since the strains used by them were not sufficiently defined. Testing a large number of strains of both organisms he found such variation in the results that the test was of no diagnostic value.

P. W. B–S.

## DENGUE AND PAPPATACI FEVERS.

LEGENDRE (Jean). La dengue Ouest-Africaine. **[West African Dengue.]**—*Presse Méd.* 1926. Aug. 11. Vol. 34. No. 64. pp. 1012–1014.

The author reports an epidemic of dengue in June, 1925, among the Europeans of Ouagadougou in the district of Haute-Volta, which coincided with a great increase in the number of *Stegomyia fasciata.* It affected half the white population (30 out of 60). He remarks that clinically the type in Central and West Africa is more severe and of longer duration than that in Indo-China. The onset is less sudden, the fever is remittent, lasting 4 to 5 days or even 6 to 8, but is not of the saddle-back type. The eruption is urticarial or measly in character, lasting 24–48 hours; relapses and reinfections are common. The dengue of the far East gives no immunity for the African type, but this does not prove that the diseases are etiologically different. The natives also are affected and they probably keep the infection going. No specific treatment was found. The author points out that it is not correct to describe the disease seen in Central Africa as a benign infection, for it may have meningeal symptoms with high temperature and may sometimes be fatal. It is probably endemic.

P. W. Bassett-Smith.

STOTT (H.) & MANGALIK (V.). **Seven-Day Dengue in Lucknow.**—*Indian Med. Gaz.* 1926. July. Vol. 61. No. 7. pp. 329–332. With 18 charts.

The author describes an epidemic of a short dengue-like fever which occurred at Lucknow from Sept.-Nov. 1925. The notes particularly refer to the nurses of the hospitals, who were heavily affected. The characters are of the usual type with saddle-back temperature curve and rash, but the term " seven day fever " is to be deprecated, as it is neither accurate nor useful. With regard to the insect carriers, it is stated that all kinds of mosquitoes were present, but that sand flies were very few in number.

P. W. B-S.

CHURCHILL (Frank S.), LANDIS (Eugene M.) & GLUSKER (S. David). **An Epidemic of Undetermined Nature: Dengue?**—*Jl. Amer. Med. Assoc.* 1926. Sept. 11. Vol 87. No. 11. pp. 821–824. With 3 charts. [14 refs.]

The authors describe a small epidemic of a short fever which occurred at Cape Cod during the summer of 1925, affecting 50 persons, 20 girls, 19 boys, 7 women and 4 men. The onset was sudden, fever short, pains often severe and mortality nil. The diagnosis rested between influenza, pleurodynia and dengue. The authors favour the last —the absence of respiratory symptoms with inability to isolate the bacillus of influenza [not of much value] negatived the first. Epidemic pleurodynia has recently been described from Philadelphia, New York City and New Jersey. The Cape Cod epidemic is the third successive summer epidemic. From true dengue it is distinguished by the absence of rash, leucopenia, and *Stegomyia fasciata*, but it is stated that more research work is required to determine the etiology of the disease.

P. W. B-S.

GAGLAZOV (B. G.). **[The Blood Picture in "Mosquito-Fever" in Crimea.]**—*Russian Jl. Trop. Med.* 1926. No. 3. pp. 47–51. [In Russian.]

The author notes that the so-called "Mosquito-Fever" of Crimea was identified by some Russian observers with "Sandfly-Fever," though its association with Phlebotomus has not been established. In investigating the blood picture in this disease, the author had in view mainly its differential diagnosis. The examination was conducted throughout the entire course of the disease on 127 soldiers of the Sebastopol garrison in accordance with Schilling's method. The results are summarized as follows: The blood in "Mosquito-Fever" is characterized by leucopenia, aneosinophilia, a rod-shaped nuclear degeneration of neutrophils with an apparent increase in the percentage of immature cells, neutropenia, lymphocytosis and monocytosis, and a complete absence of changes in the red cells. The changes in the blood picture appear in the order described and the return to the normal state is very slow, lymphocytosis being especially persistent. The results obtained serve to support the identity of this disease and "Sandfly-Fever," according to the author, and he believes that the absence of any alterations in the red cells shows that they are not attacked by the causative organism.

C. A. Hoare.

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## OROYA FEVER.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. II. Viability of** *Bartonella bacilliformis* **in Cultures and in the Preserved Blood and an Excised Nodule of** *Macacus rhesus*.—*Jl. Experim. Med.* 1926. Oct. 1. Vol. 44. No. 4. pp. 533–538. [3 refs.]

The author refers to his paper recording the cultivation of *Bartonella bacilliformis* from blood which had been brought from Lima [this *Bulletin*, Vol. 23, p. 738]. He now describes further tests of the viability in infected blood, in a nodule from an experimentally infected animal, and also in culture medium. He found that 15 specimens of blood from 7 infected monkeys (*M. rhesus*) after being refrigerated for 24 to 152 days, all gave cultures of the organism, though there was apparently no multiplication during this time. The blood kept at room temperature gave growth after 45 days; the organism not only remained alive but multiplied; 0·1 cc. of a 1 in 10 mil. dilution gave growth. In an excised nodule the organism lived for 56 days at 4° C., and 28 days at room temperature; death in the latter case was probably due to autolysis of the tissue cells. For growth from tissue it is necessary to add to the saline suspension a trace of haemoglobin and 10 per cent. of fresh horse or rabbit serum. In cultures with leptospira media at 25° C. the organism could be subcultured for 120 days, at 37° C. it dies out after 50 days, and at 4° C. it lives for months (4). The author suggests that it may be profitable to make cultures from pathological material brought from distant parts even after weeks of delay.

No photographs or drawings are given and what is meant by room temperature is not stated.

P. W. Bassett-Smith.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. III. The Behavior of** *Bartonella bacilliformis* **in** *Macacus rhesus*. **IV. The Effect of Inoculation of Anthropoid Apes with** *Bartonella bacilliformis*. **V. The Experimental Transmission of** *Bartonella bacilliformis* **by Ticks** (*Dermacentor andersoni*).—*Jl. Experim. Med.* 1926. Nov. 1. Vol. 44. No. 5. pp. 697–713. With 6 text figs. & 14 figs. on 3 plates (1 coloured). [5 refs.] ; 715–728. With 5 text figs. & 26 figs. on 4 plates (1 coloured). [5 refs.] ; 729–734. With 3 text figs. [8 refs.]

III. Further research work on the changes noted in the *Bartonella bacilliformis* in the inoculated Rhesus monkeys showed that the virulence of the organism was increased by passage ; more marked secondary anaemia was produced, in one case more like that seen in the human course of Oroya fever. The infected red·cells were so few as to be rarely found in a film, but their presence was demonstrated by culture methods. The organism was constantly demonstrated microscopically and by culture test in the lymph glands, less often in spleen, bone marrow and heart blood ; it was always present in the skin lesions. A striking feature of the investigation was that inoculation of the Rhesus might produce a typical verruga lesion or condition typical of Oroya fever, or both might be present at the same time. This variation of result depended upon the susceptibility of the animal as well as the virulence of the organism ; moreover, different tissues of the animals were found to vary in susceptibility. Three excellent plates (one coloured) show verruga-like lesions in the monkeys and some micro-photographs.

IV. Since in the previous experiment the blood picture in Rhesus monkeys was not quite similar to that of Oroya fever in man (lacking the infected red cells and nucleated forms with pernicious character), inoculations were made into young chimpanzees, since these are closely related to man, in the hope of reaching more definite results. These animals showed only slight constitutional reactions, fewer parasites in red blood corpuscles, and little anaemia, and the verruga dermal lesions were more localized near site of inoculation. Next an orang-outang was inoculated, in which there was a moderate febrile reaction. Bartonella were found in the blood, but were few in number, and the dermal lesions remained localized, so that the results were very little more definite than in the Rhesus and less generalized. It appears, therefore, that the susceptibility of both the anthropoids to the serum was less than that found in Rhesus monkeys. Again, excellent plates (one coloured) are given of the blood and tissues.

V. Finally, experiments are detailed in which the *Bartonella bacilliformis* was transmitted from infected to normal Rhesus monkeys by bites of ticks (*Dermacentor andersoni*). The time of feeding on the infected and normal animal had to be protracted to secure positive results (5 days and 6 days). The infection transmitted was mild but definite, as shown by recovery of *Bartonella bacilliformis* from lymph nodes and blood. Thus it is shown that the *Bartonella bacilliformis* recovered from human cases can be cultivated; cultures inoculated into monkeys and apes give rise to constitutional and local conditions like those of Oroya fever and verruga; and the infection can be transmitted through ticks.

P. W. B-S.

GUZMÁN BARRÓN (Alberto). La reacción de Van den Bergh, hemoaglutininas y hemolisinas en la enfermedad de Carrión. [**Van den Bergh's Reaction, Haemagglutinins and Haemolysins in Carrion's Disease.**]—*Crónica Méd.* Lima. 1926. Mar. Vol. 43. No. 753. pp. 79–89.

By the Van den Bergh reaction the author shows that in the severe anaemia of Carrion's disease the serum contains an increase of bilirubin and that there is jaundice of haemolytic origin. This does not occur in the eruptive stage of verruga.

Auto-agglutinins are present to a slight degree only in those cases in which the eruptive period follows severe anaemia; when there is no preceding severe anaemia they are absent, as are also auto-haemolysins in all stages of the disease.

Appended to the paper itself are details in tabular form of the tests on which the statements in the text are based. The paper is interesting, and should lead to further investigations along similar lines in other diseases.

H. Harold Scott.

## TROPICAL TYPHUS.

FLETCHER (William) & LESSLAR (J. E.). **Tropical Typhus in the Federated Malay States with a Compilation on Epidemic Typhus.**—*Bull. Inst. Med. Res. F.M.S.* 1925. No. 2. 88 pp. With 8 charts in text. [70 refs.]; *Malayan Med. Jl.* Singapore. 1926. May. Vol. 1. No. 2. pp. 17–22.

A very complete account of the disease in all its phases is given, much of which has already been recorded, and a full account of the clinical and laboratory records of the 18 cases.

It seems definitely proved that the authors were dealing with a specific non-contagious fever, probably contracted in dry grazing areas, spread by some form of tick or mite, running a course of about 14 days, with a very low mortality and definitely diagnosable if with the clinical signs there is a positive Weil-Felix reaction of titre 200 or over. MEGAW'S admirable table differentiating the various forms of Typhus-like fevers is referred to (see this *Bulletin*, Vol. 19, p. 68).

[The name " Tropical Typhus " is rather unfortunate, as the authors say " the term typhus is liable to mislead and alarm the public."]

P. W. Bassett-Smith.

FLETCHER (William) & LESSLAR (J. E.). **The Weil-Felix Reaction in Sporadic Tropical Typhus.**—*Bull. Inst. Med. Res. F.M.S.* 1926. No. 1. 28 pp. With 4 charts in text. [19 refs.]

The value of the Weil-Felix reaction in the diagnosis of this fever is emphasized, but a word of warning is given to ensure that the strain of Proteus X 19 used is an active one ; mistakes are made when this has not been determined. The authors examined 9 strains from various laboratories in an attempt to elucidate the divergent results of the reaction as applied to the Malayan cases and those described by MEGAW in India, and others elsewhere.

The Bland Sutton strain obtained from the Lister Institute, called here " Kingsbury," was employed alone in the earlier cases. It gave positive results in 54 cases and in 1,000 controls it was always negative, taking 1 in 200 as the minimum titre. All the strains but K produced indol in peptone water. The agglutination reactions showed that all the 9 strains were related to one another, but they separated the anindologenic strain, K, from the rest. The K strain was specific for these typhus cases, but no other anindologenic strain could be employed in its place. There are evidently two groups of cases, one giving a positive reaction with the anindologenic K strain, the second giving positive reactions with indologenic strains W type (Warsaw) and not with K. The cases themselves differed little clinically, but probably differed etiologically. In six months there were 13 of the K group and 11 of the W group. Of the 54 patients positive with K 4 died, and one of the 11 of the W group. The race incidence is interesting—32 Tamils, 20 Punjabis, 10 Europeans, 2 Malays, and 1 Chinese.

Summary.—Tropical typhus of the Malay States bears a close relationship to the typhus-like disease of MEGAW in India and similar diseases in Asia, Africa, and America.

The various strains of Proteus X 19 of different authors are not identical and are divided into two groups, indologenic and anindologenic ; the K strain differs from the other members of the latter group, but was the only one which was agglutinated by the blood of patients suffering from the tropical typhus of Malaya.

P. W. B-S.

i. FLETCHER (William) & LESSLAR (J. E.). **Tropical Typhus.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 529–531. [13 refs.]

ii. —— & ——. **Tropical Typhus and Brill's Disease.**—*Jl. Trop. Med. & Hyg.* 1926. Nov. 15. Vol. 29. No. 22. pp. 374–378. [21 refs.]

i. This is mostly a résumé of previous papers. The probable intermediary action of mice and their ectoparasites, as shown in the Adelaide epidemics, is considered of particular value. The statement is made that in the Malay States tropical typhus is as common as typhoid, hardly a week passing without one case coming under notice in the laboratory in Kuala Lumpur. In the Malay States it has a special tendency to attack cattle-keepers, etc. ; people living in towns and working in mines almost entirely escape infection. The virus, whatever it is, will not affect guineapigs and no other animal has so far been found to be susceptible.

ii. The authors recapitulate much that has already been reviewed and appear to consider tropical typhus to be a mild form of epidemic typhus altered by climate and environment. Epidemic typhus is a disease of cool climates and in hot countries flares up in the winter months and dies down in the spring; tropical typhus behaves in an opposite manner. The symptoms are the same and serum reactions similar, but as the mortality differs they are totally separated from a practical point of view. Brill's disease with similar characters is, and has been, looked upon as a distinct disease from epidemic typhus by many. The etiology is as yet uncertain, and it is therefore impossible definitely to classify them.

P. W. B-S.

SPENCER (R. R.). **A Case of Typhus-like Fever following Tick Bite.**—*Public Health Rep.* 1926. Nov. 5. Vol. 41. No. 45. pp. 2523–2524.

A woman aged 35, wife of a butcher in Norfolk, Va., was bitten in three places by a tick which came from a calf hide shipped from Virginia. At each site redness, swelling and a small ulcer followed. Ten days later fever set in with muscular pains, followed by prostration, typhus-like rash and general symptoms of that disease.

The serum did not agglutinate *Proteus* X 19 and the results of inoculation of guineapigs were negative. Clinically, the case was typhus, but laboratory confirmation was not obtained. These ticks (*Amblyomma americanum*) have not previously been implicated as a carrier of disease to man, and others working with these hides, though bitten, did not suffer.

[The strain of Proteus may have been defective.]

P. W. B-S.

# BERIBERI.

SHIGA (K.). **Prophylaxis of Kakke (Beri-Beri) and on Kakke of the Chosenese.**—*Japan Med. World.* 1926. Mar. 15. Vol. 6. No. 3. pp. 59–62.

The author states that he commenced his investigations on beriberi in 1908 to determine whether the disease was due to an infection or intoxication. He made elaborate bacteriological examinations of the intestinal contents, testing these by agglutination and complemental fixation methods, but obtained no definite results. He then went on to feeding experiments as recommended by EIJKMAN, whose conclusions he confirmed. He describes the work of TERUUCHI, SUZUKI, KUMAGAWA and others in the Japanese Navy. From twenty years work he draws the conclusion that the disease is due to metabolic disturbances caused by the absence of vitamin B, and is not one of infection or intoxication. This statement from so great an authority in Japan is of very great interest and importance, but he states that "it is conceivable that some minor deviating signs may occur owing to the individual disposition or as the consequence of other complications."

For prophylaxis the use of undermilled rice and wheat should be widely advocated by means of public education and by propaganda, and the use of polished rice should be restricted. He states also that the methods of cooking the vitamin B containing foods should be improved. From a prophylactic point of view it is immaterial whether or not beriberi is identical with vitamin B deficiency disease (viz., the avitaminosis of birds).

He gives a description of a number of dietary experiments made on Chosenese prisoners in the Government general mental hospital. These people (Koreans) are generally believed to be free from beriberi, so they were specially suitable for the experiments, but it is noted that as rice has become more usual in their diet beriberi has increased in frequency, and the increase is most marked among those who come into the towns as students, or work in the mines with the Japanese. A great increase in number of cases was also noticed after the earthquakes in 1923, probably due to the privations and exposure so caused.

P. W. Bassett-Smith.

COUTO (Miguel). Betrachtungen und Erfahrungen ueber Beriberi und Malaria. [**Observations and Experiments on Beriberi and Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. July 1. Vol. 30. No. 7. pp. 275–284.

The author states that the Brazilian medical men do not generally accept the food deficiency theory of beriberi, rather considering that it is an infectious sickness. In the North and South of Brazil the same kind of rice is used, yet beriberi is fairly common in the North and unknown in the South, and even in the North it tends to be localized in places and buildings. The best treatment is to remove the patient from the endemic area; change of diet without this is of no use, and it is considered that if the patient returns to the area, even if he does not use rice, he will probably suffer again. In the Navy the same irregularity of occurrence is noted though the rice used is the same, and in the Army experience confirms their belief in its infectiousness.

Prof. FRAGA carried out a test on prisoners using a vitamin B deficient diet; neither prisoners or controls contracted beriberi. The general conclusion of the majority of the Brazilian doctors is that "while they do not deny that a diet of polished rice may produce a disease with symptoms of beriberi, they believe that the disease which they have called by this name is one which can be nothing else but an infectious disease."

P. W. B-S.

i. BERNARD (Noël). Réaction de déviation du complément dans le béribéri humain. [**Complement Deviation in Beriberi.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 575–582. [1 ref.]

ii. PONS (R.) & BOREL (E.). Recherches sur l'étiologie du béribéri, au cours d'une épidémie survenue sur une plantation en Cochinchine (juillet-décembre 1925). [**Etiology of Beriberi. Epidemic in a Cochinchina Plantation.**]—*Ibid.* pp. 620–644. [1 ref.]

i. The author advocates the use of *B. asthenogenes* as an antigen in a complement fixation test for human beriberi on the grounds of its specificity previously brought forward by him, and he states this test will differentiate the various forms of polyneuritis found in tropical and subtropical climates from true beriberi. He also suggests that this should be the line of research for the next Congress of the Society of Far East Tropical Medicine, with regard to beriberi. He employed the technique of CALMETTE & MASSOT, using guineapig serum for the complement, and sheep cells for the test. In practice the cases are divided into sporadic, the ordinary form, and epidemic outbreaks treated in hospital. In the former 70–72 per cent. of 69 beriberi patients gave positive reactions; of the other cases 10 per cent. reacted positively and 90 per cent. were negative.

ii. In the epidemic, stated to have been undoubtedly beriberi, recorded by Pons & Borel, occurring in plantations of Suzannah An-loc and Cam-Tien, near Saigon, of 23 cases 9 were positive before the appearance of paralysis and 11 were negative; of 22 cases after paralysis 17 were positive and 3 were negative, the reaction disappearing before death. These plantations are of recent origin and are mostly recruited from Annam, the coolies being often debilitated by malaria. They all received the same form of rice with occasionally fish, pork and fresh vegetables and fruit.

Out of 257 coolies there were 65 cases with 21 deaths. Details of 10 cases are given, all of which were fully investigated. The increase of positive reactions in parallel with the occurrence of the nerve signs, so say the authors, substantiates the intestinal toxic infectious origin of human beriberi as described by Noel Bernard.

P. W. B-S.

JANSEN (B. C. P.) & DONATH (W. F.). Over het isoleeren van antiberiberi-vitamine. [**The Isolation of Anti-Beriberi Vitamin.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 4. pp. 573–574.

The importance of this subject justifies a somewhat detailed summary of this short preliminary report. For the biological standardization of their preparations the authors used a small bird, *Munia maja*, which, with few exceptions, shows symptoms of polyneuritis after 9 to 13 days feeding with washed, polished rice. Addition of 5 per cent. of rice polishings (rice-bran) lengthens this period to from 15 to 23 days whilst 10 per cent. affords protection for at least 28 days.

The process of concentration is as follows. Rice-bran is extracted with very dilute acid and the extract treated with "acid clay" (*cf.* Seidell, 1916) on which the vitamin is adsorbed and from which it can be liberated by the addition of baryta, yielding a solution from which the baryta is removed by neutralization with sulphuric acid. The filtrate from the precipitated barium sulphate is mixed with silver sulphate or nitrate and enough baryta to make the pH 3·5. The inactive precipitate thus produced is filtered out and the pH of the filtrate raised to 6·5 by the addition of more baryta when a precipitate rich in vitamin is formed. This is collected, dissolved in hydrochloric acid, the vitamin reprecipitated by phosphotungstic acid and recovered by the use of baryta, excess of the latter being removed by neutralization with sulphuric acid. The filtrate, after acidification with hydrochloric acid is evaporated to dryness, the residue taken up in absolute alcohol and the vitamin precipitated as a crude platinichloride from which by the use of hydrogen sulphide it is regenerated as the hydrochloride. The latter is then recrystallized from a mixture of dry alcohol and acetone until pure. The base appears to have the composition represented by the formula $C_6H_{10}ON_2$, and it seems to be the vitamin itself since 1 part of it in 500,000 parts of washed polished rice protects *Munia maja* against polyneuritis.

[It is interesting to note that among numerous other workers also engaged in the task of isolating the anti-neuritic vitamin KINNERSLEY and PETERS in Great Britain (*Biochem. Jl.*, 1925, Vol. 19, p. 820) have obtained from yeast a concentrate of the vitamin, which is claimed to be protective for pigeons in daily doses of 0·084 milligramme.—T. A. Henry.]

W. J. Bais.

SUZUKI (Tadashi). **Position of the Diaphragm as a New Feature in the Cardiac Type of Infant Beriberi.**—*Oriental Jl. Dis. Infants.* 1926. Oct. Vol. 1. No. 4. English summary pp. 91–102. With 18 figs. [In Japanese.]

The author states that in many years experience in the infant clinic at Kyoto he always finds enlargement of the heart in beriberic infants, particularly affecting the right side. The X-ray examinations show that in the cardiac type the diaphragm is considerably depressed (two ribs) and returns to normal in convalescence. In atrophic cases the depression is negligible. The author theorizes that this depression is primary and causes a negative pressure within the pleura; this again causes congestion in the lungs, and then follows the hypertrophy of the right heart.

P. W. B–S.

MONTES (José E.). El agente etiológico del beriberi. [**The Causal Organism of Beriberi.**]—*Los Progresos de la Clinica.* Madrid. 1926. Vol. 34. No. 2. 31 pp. With 1 coloured plate & 19 text figs. [9 refs.]

Beriberi is a very prevalent disease in the Philippines and the infantile form is responsible for many deaths. The author, examining adult patients, found in many of them a little pleural exudate ; he was able to withdraw 2–3 cc. from the majority and in one case as much as 18 cc. In smears [illegible] in bacilli, and was able to cultivate the [illegible] children recently dead of the disease he obtained the same organism and found that it conformed to the morphology and reactions of *B. mycoides* or *B. mesentericus.*

Experimentally inoculated into monkeys and into cats the organisms caused death with conditions similar to those found in the children ; in particular, haemorrhages in the lungs, liver, spleen and heart.

A vaccine was prepared and standardized to contain 1,000 million per cc. This was injected in doses of 0·25–0·5 cc. as the initial dose for children, double this for adults, later injections for the latter being raised to 1·5 cc.

The author states that records of 400 cases so treated showed that 72 per cent. were cured and 18 improved. Administered to women in pregnancy it proved very successful as a preventive of infantile beriberi.

[As no controls were made the value of the treatment must be considered doubtful.—P. W. B–S.]

H. Harold Scott.

# SCURVY

v. HAHN (F. V.). Ueber einer Ursache des Ausbruchs von Skorbut. [**A Cause of the Outbreak of Scurvy.**]—*Deut. Med. Woch.* 1926. July 30. Vol. 52. No. 31. p. 1300. [4 refs.]

The first part of the paper refers to the author's earlier work in which he pointed out that vitamin C was probably not a definite chemical compound, but depended for its action on the colloidal condition of the food, and a table is given in which the " vitaminoidal " values of different foods are stated. Some of the most valuable substances demonstrated by him are coffee and alcohol, which are not effective on experimental animals. He mentions that patients on deficiency diets may sometimes live many years without clinical signs and then suddenly haemorrhages, etc., may come on, without apparent change in the diet. He concludes from his experiences that the protective agents are present in the fluids rather than in the solids of food. Two cases out of many are quoted ; in one the morning coffee was stopped, in the other the alcohol, which the man was in the habit of taking in excess, was cut off. In each case stomatitis and haemorrhages with pain were the clinical evidences. His contention does not appear to be proved as many other factors might have influenced the results.

P. W. Bassett-Smith.

CHAHOVITCH (X.). Métabolisme énergétique au cours du scorbut expérimental. Etude du quotient métabolique. [**Metabolism in Experimental Scurvy.**]—*C.R. Acad. Sci.* 1926. June 7. Vol. 182. No. 23. pp. 1406–1408.

As the symptoms of scurvy develop in guineapigs the animals' metabolism measured at their own body temperature gradually rises till it is about doubled, while the metabolism measured at 1°–2° C. remains fairly constant throughout the course of the disease. This change in the metabolism can be expressed in terms of the " metabolic quotient " of Giaja, which is $\frac{\text{metabolism at low temperature}}{\text{metabolism at normal temperature}}$; this quotient in the case of healthy guineapigs is round about 3·6, while in the scorbutic animals it falls to 1·7 or even lower. The author with GIAJA has previously shown that the injection of adrenalin to rats causes a diminution of this quotient. It is also known that in scurvy guineapigs the suprarenal capsules are hypertrophied and the thyroids enlarged. The hypothesis is suggested that the metabolic rise in experimental scurvy is due to the hyper-activity of the suprarenal capsules and the thyroids.

P. W. B–S.

## KALA AZAR.

ANDERSON (Ch.). Chronique des leishmanioses en Afrique du Nord. **[Leishmaniasis in North Africa.]**—*Rev. Tunisienne Sci. Méd.* 1926. Mar. 8 pp. With 2 maps in text.

This paper gives an account of the known distribution of kala azar and oriental sore in Tunis, Algeria, Morocco and Tripoli. Of the 75 cases of kala azar from Tunis all, with the exception of one which occurred in the southern district of Degache, were from the northern area and were related to the distribution of the Italian inhabitants. Canine kala azar was found in 2 per cent. of the dogs of Tunis. In Algeria the 8 proved cases were more irregularly distributed, while the dogs of Algiers have been found infected to the extent of 7 per cent. In Morocco 2 cases have been reported, while dogs are said to show a high percentage of infections. In Tripoli a case has been recorded, but precise statistics are wanting. The question of canine kala azar in this country is doubtful. As regards oriental sore, this has been recorded from all four countries. In Tunis the disease, with the single exception of a case reported from the northern area, is limited to the southern districts, particularly Gafsa. In Algeria and Morocco the distribution is more irregular. According to the view expressed by SERGENT the density of the transmitting fly possibly accounts for the distribution. The paper contains a table and maps showing the details of the distribution of the two diseases.

C. M. Wenyon.

ARTAMONOV (A. S.). [Au sujet de la propagation du leishmaniose visceral (kala-azar) à Samarcande et du traitement de cette maladie par le stybenile.] **[Kala Azar at Samarcand: Treatment by Stibenyl.]**—*Russian Jl. Trop. Med.* 1926. Nos. 6–7. pp. 35–40. [In Russian.]

During the last two years (1924–1926) 138 cases of kala azar were recorded in Samarkand (Turkestan). Children under 11 years of age were chiefly affected, the maximum number of cases being between the ages of one and three years. The death rate was very high (over 58 per cent.). In treatment antimony preparations gave the best results and were superior to neosalvarsan.

C. A. Hoare.

PATTON (W. S.) & HINDLE (Edward). **Notes on Kala Azar in Shantung.**—*Proc. Roy. Soc.* 1926. Oct. 1. Ser. B. Vol. 100. No. B 704. pp. 379–384. With 1 text fig. [4 refs.]

The authors have examined the records of the hospital of the Shantung Christian University Medical School for the 6 years following uly, 1920, with reference to 301 patients admitted for kala azar. The information obtained is summarized in the paper. The age incidence is similar to that mentioned by YOUNG (this *Bulletin*, Vol. 21, p. 249). The majority of the cases were males and, even allowing for the fact that females are less likely to be brought to hospital, it appears that the disease is actually commoner amongst males. The figures relating to the months of onset give no evidence of any seasonal incidence of the disease. The mean duration of the disease is 1 to 2 years and is thus longer than that of the disease in Assam. Some patients gave statements indicating a duration of symptoms up to 15 years. In Shantung the disease is specially prevalent in country villages. It is not evenly distributed throughout the province. One village may be infected and a neighbouring one free from infection. In its endemic nature and the occurrence of occasional epidemics there is a resemblance to Indian kala azar. In the survey of a village, Chen Li Chia, the distribution of the cases, which is shown on a map, did not indicate any site infection.

C. M. W.

PARADISO (F.). Sulla distribuzione altimetrica del Kala-Azar infantile in provincia di Catania e sulla età dei piccoli leishmaniotici. **[The Distribution in Altitude of Infantile Kala Azar in Catania and the Age of the Children Affected.]**—*Pediatria.* 1926. June 15. Vol. 34. No. 12. pp. 664–668. [3 refs.]

The province of Catania in Sicily appears to be the most important endemic centre of kala azar in the Mediterranean basin, for the total of 118 cases of the disease recognized during the period 1910–1915 has been increased in the succeeding 10 years to 1,424, all of them diagnosed by the discovery of the parasite. The topography of the province with its sea-board which rises rapidly along the slopes of Mount Etna affords an excellent opportunity of studying the effects of altitude on the incidence of kala azar. Cases have been noted at Aci Trezza, which is only 5 metres above sea level, and also Centuripe and Nicolosi which are 733 and 698 metres respectively. The incidence, however, is greater at the low-lying places and Catania at 38 metres has yielded 1,164 cases. The cases recorded from the various localities and the altitudes are given in a table. It has to be remembered, however, that the greater the distance from Catania, where there is a kala azar dispensary, the less probability is there that children will be brought for treatment.

Another point which is emphasized is the fact that the disease is not exceptional during the first months of life, as illustrated by the following table :—

| *Ages.* | *Cases.* |
|---|---|
| From 1 to 6 months | 21 |
| ,, 6 ,, 12 ,, | 168 |
| ,, 1 ,, 2 years | 694 |
| ,, 2 ,, 3 ,, | 248 |
| ,, 3 ,, 4 ,, | 116 |
| ,, 4 ,, 5 ,, | 46 |
| ,, 5 ,, 10 ,, | 46 |
| ,, 10 ,, 15 ,, | 7 |
| Age not determined | 78 |
| Total | 1,424 |

The 21 cases occurring during the first six months of life are distributed as follows : 1–2 months, 1 ; 2–3 months, 1 ; 3–4 months, 1 ; 4–5 months, 5 ; 5–6 months, 13. It is evident that infection may occur during the first month of life.

C. M. W.

LEGER (Marcel). Liens de parenté des divers leishmania. **[Relationship of the Leishmanias.]**—*Rev. Prat. Malad. des Pays Chauds.* 1926. Feb. Year 4. Vol. 5. No. 10. pp. 439–445. [13 refs.]

The author reviews the experiments which have shown that local lesions may result from cutaneous inoculation with *Leishmania donovani* and generalized infections from intraperitoneal inoculations with *Leishmania tropica.* These results indicate the close relationship of the two parasites. Without further work it cannot be stated that the two are actually one species or that the one is merely a more virulent form of the other, but the experiments do indicate that the ancestors were very nearly related.

C. M. W.

SHORTT (H. E.), BARRAUD (P. J.) & CRAIGHEAD (A. C.). **The Life-History and Morphology of** *Herpetomonas donovani* **in the Sandfly** *Phlebotomus argentipes.*—*Indian Jl. Med. Res.* 1926. Apr. Vol. 13. No. 4. pp. 947–959. With 5 plates (4 coloured) & 1 text fig. [6 refs.]

In this paper, which is well illustrated with coloured plates, the authors describe in detail the various changes undergone by the parasite of kala azar after its ingestion by the sand fly. There is at first a growth of the parasite followed by the development of a flagellum and other changes which culminate in the formation of the elongate flagellate leptomonas. Commencing with the unchanged parasite which is regarded as the first type five different types of organism are recognized, the 5th being the elongate form. Type 2 is the enlarged parasite without a flagellum, type 3 the stumpy or rounded flagellate form and type 4 the immature or " larval " flagellate. Types 3, 4 and 5 occur at all stages of development after their first appearance and they all multiply actively. The shorter types are mostly in close association with the walls of the spaces in which they occur. The most advanced forms as regards their situation in the fly are the flagellates of type 5. The course of development in the fly appears to be an accurate recapitulation of that previously observed in N.N.N. culture medium.

C. M. W.

SHORTT (H. E.), BARRAUD (P. J.) & CRAIGHEAD (A. C.). **Note on a Massive Infection of the Buccal Cavity of** *Phlebotomus argentipes* **with** *Herpetomonas donovani.*—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 329–330. With 1 plate. [2 refs.]

Further experiments on the development of *Leishmania donovani* in *Phlebotomus argentipes* have resulted in the finding of flagellates in one fly in a still more anterior position than that described in the previous paper by the authors (this *Bulletin,* Vol. 23, p. 573). The fly in question, which had had two feeds and was examined on the 9th day after the initial one, was found to have a massive growth of flagellates extending forwards from the proventicular growth in an unbroken column throughout the length of the pharyngeal and buccal cavities until it reached the mouth proper where the biting appendages take origin, the most anteriorly placed flagellates extending even beyond this situation. The most anterior part of the growth was anterior to the salivary pump so that it appears certain that such a fly could not fail to infect the wound made if it fed a third time. The infection of the fly, especially in its most anterior part, consisted chiefly of elongate flagellates and not of rounded forms which have been assumed by some to be the infective forms. The paper is illustrated by a camera lucida drawing of a longitudinal section of the fly showing the extension of the flagellate infection.

C. M. W.

SHORTT (H. E.), BARRAUD (P. J.) & CRAIGHEAD (A. C.). **The Occurrence in Nature of** *Phlebotomus argentipes* **infected with a Flagellate Morphologically Identical with** *Herpetomonas donovani.* —*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 521–522. [2 refs.]

A fly caught in a kala azar house on the evening of July 26, 1926, was seen to contain the remains of a blood meal. It was kept till the morning of July 29th, when it was found to be dead. When dissected it revealed a heavy infection with flagellates which showed a massive grouping in the region of the proventricular fold. There was no extension beyond this point anteriorly. The type of infection and the character of the flagellates represented a reproduction of the conditions seen in experimentally-infected flies. This fly taken at the village of Bakhtiapur, about a mile and three-quarters to the north of the Pusa Estate in Bihar, represents the first natural infection to be found.

C. M. W.

YOUNG (Charles W.) & HERTIG (Marshall). **The Development of Flagellates in Chinese Sandflies (Phlebotomus) fed on Hamsters infected with** *Leishmania donovani.*—*Proc. Soc. Experim. Biol. & Med.* 1926. Apr. Vol. 23. No. 7. pp. 611–615. [5 refs.]

The sandflies of North China are three species of *Phlebotomus.* One is *P. major* var. *chinensis,* the others are undetermined, and are designated *P.* " *B* " and *P.* " *C.*" Flies collected in kala azar houses and elsewhere have been examined for flagellates and flies bred in the laboratory have been fed on kala azar cases and employed for transmission experiments.

A total of 378 females and 48 males of *P.* " *C* " were all found free from flagellate infections. Of 373 which had fed on kala azar cases and infected hamsters 7 were found to be infected. These positive flies were dissected as follows: 4 on the 3rd day, and 1 each on the 4th, 5th and 8th days. The positive flies were amongst those which had fed only on infected hamsters.

The dissection of 72 wild *P. major* var. *chinensis* yielded no flagellates. Of 34 of these flies fed on striped hamsters 29 were found infected with flagellates. They occurred chiefly in the oesophagus or anterior portion of the mid-intestine and occasionally in the oesophageal diverticulum. The positive flies were dissected from 4 to 8 days after the infective feed.

As regards *P.* " *B* " a dissection of 21 yielded no result. Attempts to feed over 70 of these flies were unsuccessful.

Sandflies reared in the laboratory were fed on kala azar cases and on heavily infected hamsters. These flies were then fed on uninfected hamsters and a certain number were inoculated into the animals. Of a total of 250 hamsters used in these experiments all have proved negative on liver puncture made from 81 to 137 days after the attempted transmission. The autopsy findings will be reported later.

[PATTON and HINDLE in their paper on the sand flies of N. China point out that *Phlebotomus* " C " is a variety of *P. sergenti* Parrot var. Newstead and *Phlebotomus* "B" a new variety of *P. perturbans*. (*Proc. Roy. Soc.* Ser. B. Vol. 100, p. 405.)]

C. M. W.

NICOLLE (Charles) & ANDERSON (Charles). Recherches expérimentales sur le mode de transmission du kala azar. Quatrième série d'expériences. [**Experiments on the Mode of Transmission of Kala Azar.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 114-117. [1 ref.]

With a view to testing the possible transmission of kala azar by way of the alimentary tract a young dog and a heavily infected dog were kept together free from ectoparasites for 3 months. No infection resulted. Another very young dog was made to ingest with its milk daily for a similar period the faeces from heavily infected dogs. The result was the same and the authors concluded that canine leishmaniasis does not appear to be contracted by way of the digestive tract. It is pointed out that the virus employed in these experiments was a naturally occurring canine one and that it has been carried on in dogs by subinoculations to its twelfth passage, since its isolation on December 19th, 1922.

C. M. W.

SHORTT (H. E.), BARRAUD (P. J.) & CRAIGHEAD (A. C.). *Conorhinus rubrofasciatus*, **de Geer, and Indian Kala-Azar.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 239-242. [3 refs.]

In the experiments described 165 specimens of *Conorhinus rubrofasciatus* in various stages of development were fed on cases of kala azar. In no instance were developmental forms of *Leishmania donovani* discovered when the bugs were dissected.

C. M. W.

MAZZA (Salvador). Leishmaniosis tegumentaria y visceral. [**Dermal and Visceral Leishmaniasis in Argentina.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 13. pp. 209-216. With 27 figs. on 14 plates.

The paper deals with various aspects of the question of leishmania infections in the Argentine and appears to be a summary of the observations reported in the several papers reviewed in this number of this *Bulletin*. In addition to the dog noted in another paper a second one is described which had large ulcers on the flank. In these also leishmania were demonstrated. As regards the transmission of the parasite it is noted that suspicion rests on the sand fly, which is represented by a species allied to, if not identical with, *Phlebotomus verrucarum*.

C. M. W.

MAZZA (Salvador) & ARIAS (Jorge Cornejo). Primeros casos autóctonos de kala-azar infantil comprobados en el norte de la República (Tabacal y Orán, Salta). **[First Cases of Kala Azar contracted in Argentina.]**—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. No. 11. pp. 140–144. With 3 text figs.

—— & ——. Premiers cas autochtones de kala-azar infantile en Argentine.—*C.R. Soc. Biol.* 1926. Sept. 21. Vol. 95. No. 27. p. 816.

Two cases of kala azar in children aged 5 and 9 years are recorded. These are the first autochthonous cases of the disease to be described in Argentina. The first case was at Oran (Salta) and the second at Tabacal. Leishmania were found by spleen puncture in the first case but not in the second ; owing to its failure to react to intensive quinine treatment and the response to injections of tartar emetic there appears to be little doubt about the diagnosis. It is noted that many emigrants from endemic centres of kala azar in the Mediterranean districts come to the country and though a case has been seen previously in a child from Catania the two children mentioned are the first to have contracted the disease locally.

C. M. W.

NAPIER (L. Everard). **The Pentavalent Compounds of Antimony in the Treatment of Kala-Azar. I. Stibosan (von Heyden 471); an Analysis of the Results of the Treatment of the First 104 Cases.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 263–279. With 1 text fig. [4 refs.]

The author analyses in detail the facts concerning the treatment of the 104 cases mentioned in the title with special reference to the quantity of drug which should be administered to effect a cure. The chief difficulty is to determine whether cure has taken place or not, since there is no infallible test that can be applied after a course of treatment has been completed. Experience has shown that when relapses occur they do so within 2 months, so that it is concluded that cure is absolute if no relapse has occurred within 6 months. Of the 104 cases treated 90 were discharged from hospital as cured, 2 failed to respond to treatment, 11 died and 1 did not complete the course. The 11 fatal cases were, with one exception, in very poor condition when treatment commenced. Of the 90 cases discharged as cured 77 were traced 6 months later. Of these 70 had remained in good health, while 7 had relapsed. In the majority of cases a final test was made at the end of treatment. This was either blood culture, spleen puncture culture or liver puncture culture. In 71 cases in which one or other of these tests gave a negative result relapse occurred in 4. Of 2 cases which were positive to liver puncture culture the final result was a cure while in 1 case which was positive to spleen puncture culture there was relapse. Of 3 cases discharged without any test of the kind 2 relapsed. It thus appears that though such a final test may reveal parasites ultimate cure may take place. Of 4 clinical signs of the action of the drug, viz., cessation of fever, diminution in size of spleen, improvement in the leucocyte count and increase in weight, the first is the most important. If those patients who were febrile or afebrile throughout the course are left out it is seen that the relapse rate was 5 per cent. in those cases in which fever ceased before the 6th injection, 12·8 per cent. in those in which it persisted after the 6th injection, and 30·8 per cent. in those in which it persisted up to the 8th injection. Though reduction in size of the spleen is an important point it cannot be accepted as a determining factor in considering whether a patient is cured or not. As regards the leucocyte count the only deduction that can be drawn is that a count of 8,000 or over is an indication of cure, but the converse cannot be argued. It may be concluded that a substantial increase in weight of, say, 7 lb., may be looked upon as a point in favour of assuming that a patient is finally cured.

After a trial of various methods of administering the drug it was decided to give 0·2 gm. as the initial dose and 0·3 gm. on each occasion subsequently. The injections were given intravenously three times weekly, in most instances in a 5 per cent. solution. Of the 77 patients who were discharged as cured and who were traced 69 received from 10 to 15 injections. The majority of patients over 15 years of age received a total of about 3 gm. of drug. It is concluded that a satisfactory dose for an initial course would be 3·5 gm. After this a relapse rate of 9 per cent. could be expected and this could be reduced to 2 per cent. by giving the relapsed cases a second course of 6 gm., or to 1 per cent. by giving a course of 10 gm. The author points out that he formerly had the impression that an insufficient initial course made a patient more resistant to subsequent treatment. He now thinks there is no evidence in favour of such an assumption. The mere fact that they were not cured after the first course is an indication that they were already resistant to a certain degree before any treatment was instituted. When a patient returns for treatment immediately after symptoms recur, usually within 2 months after discharge, a course of treatment shorter than the original course will often bring about a cure.

C. M. W.

STRUTHERS (E. B.). **The Advantages of the Organic Preparations of Antimony in the Treatment of Kala-Azar. A Preliminary Note.**—*China Med. Jl.* 1926. Sept. Vol. 40. No. 9. pp. 849–850.

The note draws attention to the fact that organic antimony compounds are superior to the tartrates in the treatment of kala azar and mentions Stibamine glucoside, " Neostam," Von Heyden " 471," Stibosan and Von Heyden " 661,"Antimosan as being the most valuable of those obtainable in China. The last named is not so effective as the others, but has been found of value in the treatment of very severe cases.

C. M. W.

SMYLY (H. Jocelyn). **Chemotherapy of Experimental Leishmaniasis in Hamsters.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. pp. 104–110. With 1 text fig. [11 refs.]

The paper describes the treatment in China of hamsters experimentally infected with *Leishmania donovani* by various drugs—tryparsamide, sodium and potassium tartrobismuthate, ethyl hydrocarpate and sodium antimony tartrate. In no case was an infected hamster cured, but it was noted that there had been produced some reduction in the weight of the spleen.

C. M. W.

DUNLAP (A. M.). **Chronic Laryngeal Stenosis complicating Kala Azar and Diphtheria.**—*China Med. Jl.* 1926. May. Vol. 40. No. 5. pp. 409–415. [5 refs.]

Two cases of laryngeal stenosis necessitating the introduction of the laryngeal tube occurred in two children undergoing treatment in hospital for kala azar. In the first case it was not possible to remove the tube for more than ten to twenty minutes at any time during a period of about 6 weeks. In the second case, in which the stenosis was not so severe, the tube was kept constantly in use for two weeks and more irregularly for one week. In both cases the condition of stenosis passed off.

C. M. W.

MAYER (Martin). Empfänglichkeit des europäischen Hamsters (*Cricetus frumentarius*) für Kala-Azar. [**Susceptibility of the European Hamster to Kala Azar.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Aug. 1. Vol. 30. No. 8. pp. 347–348. [1 ref.]

The reports relative to the susceptibility of the N. China hamster to inoculations with *Leishmania donovani* led the author to test the European hamster from this point of view. Three were inoculated with liver puncture material and two with cultural forms from the same case. One of the first three was killed after 6 weeks and found to be uninfected. One of the culture-inoculated animals died with a very heavy infection of the organs on the 159th day. Liver puncture of the remaining 3 animals showed that they also were infected. Two which had been inoculated with liver puncture material died of haemorrhage on the 273rd day and were found to have a very intense infection. It is evident that the European hamster is very susceptible to inoculations with *Leishmania donovani,* and may serve as a useful animal for therapeutic investigations in Europe.

C. M. W.

HINDLE (Edward) & PATTON (W. S.). **Experiments bearing on the Susceptibility of the Striped Hamster** (*Cricetulus griseus*) **to Leishmania of Chinese Kala Azar.**—*Proc. Roy. Soc.* 1926. Oct. 1. Ser. B. Vol. 100. No. B 704. pp. 374–379. [4 refs.]

Infection experiments with non-flagellate and flagellate stages of leishmania were made with striped hamsters. By the percutaneous and subcutaneous methods of inoculation of non-flagellate stages no infections were produced. Subsequent inoculation of the animals intraperitoneally led to infection, thus proving that the previous futile inoculations had not produced immunity. With flagellate stages infections resulted from all three methods of inoculation, but in all cases the intraperitoneal route was the one of choice. The intensity of the infection varied with the dose of virus employed.

C. M. W.

HINDLE (Edward), HOU (P. C.) & PATTON (W. S.). **Serological Studies on Chinese Kala Azar.**—*Proc. Roy. Soc.* 1926. Oct. 1. Ser. B. Vol. 100. No. B 704. pp. 368–373. [17 refs.]

In the case of Indian strains of leishmania there is general agreement that normal human serum is inimical to the cultural forms of the organism. This property of the serum is destroyed by heating it to 55° C., so that it would appear that the action depends on the presence of complement. The authors have found that the Chinese strain of leishmania is similarly affected by serum, which loses its property of damaging the flagellates when heated to 55° C. for 30 minutes. Cerebrospinal fluid, which contains no complement, was without action. The test was conducted by mixing cultural forms of the parasite with serum and observing the result. It was found, however, that though by direct observation all the flagellates seemed to be destroyed, on staining films of the mixture certain flagellates appeared to have been uninfluenced by the serum. It would appear, therefore, that the flagellates in cultures must possess biological differences.

It might be urged that the destructive power of serum is an indication that the natural infective stage of the organism is not the flagellated one, but observations noted above and the fact that hamsters can be infected by injection of the flagellated stage leaves this doubtful. It was noted that there was no increase in the complement of the serum in kala azar.

With an antigen prepared from the spleens of heavily infected hamsters the complement fixation test was carried out in 24 cases of kala azar. In 19 a well-marked reaction was obtained. In 5 cases there was only a partial reaction, but in these the haemolysis was less than in the controls. Three cases successfully treated with tartar emetic gave a negative reaction.

C. M. W.

HINDLE (Edward) & PATTON (W. S.). **Resistance of Leishmania Cultures to Cold.**—*Proc. Roy. Soc.* 1926. Oct. 1. Ser. B. Vol. 100. No. B 704. pp. 385–386.

It was determined that cultures of leishmania were still viable after intermittent exposure to temperatures of —12° C. for a period of at least 10 days. It would seem possible that in the alimentary tract of a hibernating insect the flagellates would be able to persist throughout the winter.

C. M. W.

WAGENER (Edna Hannibal) & KOCH (Dorothy Ann). **The Biological Relationships of Leishmania and Certain Herpetomonads.**—*Univ. California Public. Zool.* 1926. Mar. 16. Vol. 28. No. 20. pp. 365–388. With 53 figs. on 4 plates. [26 refs.]

The investigations reported in this paper are, as far as agglutination phenomena are concerned, similar to those of KLIGLER and NOGUCHI (this *Bulletin,* Vol 21, p. 726, Vol. 23, p. 581 and Vol. 22, p. 692). In this case the antigen employed consisted of a suspension of dead flagellates in 0·9 per cent. sodium chloride solution. This antigen was put up against the sera of rabbits which had received injections of cultures of *Leptomonas ctenocephali* and various species of *Leishmania.* The results showed that there was no biological relationship between *Leptomonas ctenocephali* and the species of *Leishmania*, but the five strains of the latter all showed marked group reactions in the presence of antisera of any member of the genus.

Rabbits sensitized to any strain of *Leishmania* give positive skin reactions to antigens of all of the group. No intradermal reaction was obtained with antigens of *L. ctenocephali* or *Trypanosoma lewisi.* Guineapigs may also be sensitized to both *Leishmania* and *Leptomonas.* The skin reaction was considered positive when there appeared a red indurated area 4 to 5 mm. in diameter at the end of 24 hours, which reached its height at 48 hours. A coloured plate illustrates the character of the reactions.

Attempts to infect mice with *Leishmania, Leptomonas ctenocephali* and flagellates from the box-elder bug (*Leptocoris trivittatus*) and the water-strider (*Hygrotrechus* sp.) were not successful. Similarly, failure attended the efforts to infect the local field mouse (*Peromyscus maniculatus sonoriensis*) with *Leishmania.*

Examinations of cultures of *Leishmania* and *Leptomonas ctenocephali* at different stages of growth have led the authors to believe that the flagellates pass through definite cycles. Round forms at first appear, and these become the elongate flagellates which later revert to the round forms again. *Leishmania* requires from 21 to 30 days to complete the cycle while *L. ctenocephali* needs only 8 to 10 days.

C. M. W.

NOGUCHI (Hideyo) & TILDEN (Evelyn B.). **Comparative Studies of Herpetomonads and Leishmanias. I. Cultivation of Herpetomonads from Insects and Plants.**—*Jl. Experim. Med.* 1926. Sept. 1. Vol. 44. No. 3. pp. 307–325. With 6 plates. [30 refs.]

——. **II. Differentiation of the Organisms by Serological Reactions and Fermentation Tests.**—*Ibid.* pp. 327–337. [6 refs.]

The investigations recorded in these papers have to do with certain insect and plant flagellates which are very closely allied to those which produce kala azar and oriental sore and belong to the same herpetomonad or, as some prefer to say, leptomonad group. The flagellates of insects and plants belong to twelve strains which have been isolated in pure culture by the use of various media in test tubes and on plates. Four cultures were obtained from latex-feeding insects (*Oncopeltus fasciatus, Oncopeltus* sp., *Lygaeus kalmii*), three from latex plants (*Asclepias syriaca, Asclepias nivea*), two from mosquitoes (*Culex pipiens, Anopheles quadrimaculatus*), one from the house-fly (*Musca domestica*) and two from blue-bottle flies (*Calliphora*). The flagellates have been differentiated chiefly by their biological relationships. Thus, the 7 strains from latex-feeding insects and latex plants represent two distinct species which have been named *Herpetomonas oncopelti* and *H. lygaeorum.* The two strains from mosquitoes were biologically identical and were named *H. culicidarum.* The strain from the house fly contained larger individuals than any other strain and was morphologically distinct from either of the blue-bottle strains. None of the fly flagellates could be identified with *Herpetomonas muscae domesticae* or *H. calliphorae,* so they have been given new names, *H. muscidarum, H. media* and *H. parva.* In no case did the cultural forms of the flagellates resemble the naturally occurring ones, the influence of the nature of the culture medium showing itself in the morphological variations. In a table the detailed measurements of the various species as they appeared in leptospira medium are set out.

In the second paper the serological experiments are described. They were carried out by testing the agglutinating power of immune sera produced in rabbits, as described by NOGUCHI for the differentiation of species of *Leishmania* (this *Bulletin*, Vol. 22, p. 692). In addition to the flagellates mentioned above, cultures of *Leishmania tropica, L. brasiliensis, L. infantum, L. donovani, Herpetomonas ctenocephali* and *Trypanosoma rotatorium* were included in the study. In addition the complement fixation test was used. Furthermore, the capacity of the various flagellates to ferment sugars was tested, and it was found that there was a great variability in the fermentative faculty of different flagellates. The results led to the recognition of the species named above.

C. M. W.

FRANÇA (Carlos). Quelques considérations sur les "Leishmania." [**Thoughts on the Leishmanias.**]—*Mém. et Etudes du Muséum Zool. de l'Univ. de Coimbra.* 1926. Ser. 2. No. 2. 7 pp. With 4 text figs. [10 refs.]

The paper discusses the genera *Leishmania, Leptomonas* and *Herpetomonas.* The first is regarded as a synonym of the last-named. A member of the genus *Leptomonas* is regarded as possessing no rhizoplast, the flagellum arising directly from the blepharoplast. When division occurs the blepharoplast divides and a new flagellum grows out from the daughter blepharoplast. A member of the genus *Herpetomonas* is said to possess a rhizoplast which gives origin to the flagellum. In division both the blepharoplast and the rhizoplast divide, a new flagellum forming from the end of the daughter rhizoplast. Owing to the fact that rhizoplasts, which are duplicated when division occurs, have been demonstrated in the parasites of kala azar and oriental sore they are regarded as belonging to the genus *Herpetomonas.*

C. M. W.

SERGENT (Edm. & Et.), PARROT (L.), DONATIEN (A.) & BÉGUET (M.). Transmission expérimentale du bouton d'Orient (clou de Biskra) à l'homme par *Phlebotomus papatasi* (Scopoli). [**Experimental Transmission of Oriental Sore to Man by** *P. papatasii.*]—*Ann. Inst. Pasteur.* 1926. May. Vol. 40. No. 5. pp. 411–430. With 5 text figs. [15 refs.]

In 1921 the authors inoculated crushed *Phlebotomus papatasii* into the skin of a volunteer with the result that a lesion resembling oriental sore and containing leishmania developed (this *Bulletin*, Vol. 19, p. 315 and Vol. 23, p. 584). They now give an illustrated account of the lesion produced and inoculation experiments made with the virus from the sore. The small papule which was noted at the site of inoculation two months and twenty-four days after the application of the crushed sand flies increased progressively in size and eventually became an ulcer. During the 5th month of its development local applications of urotropine were commenced and were continued till a cure at the 7th month was obtained. The photographs show the lesion at different stages. As regards the parasites, both the forms in smears from the sore and those that developed in cultures were identical with the corresponding forms of *Leishmania tropica.*

With the cultures 6 mice were inoculated intraperitoneally. Five were uninfected, but 1 died after 4 months and 8 days and showed numerous leishmania in the liver, spleen and testicles. Five other mice similarly inoculated failed to become infected. One other mouse was inoculated intraperitoneally and 5 intratesticularly. All these showed swelling and finally ulceration of the scrotal region. When examined there were numerous leishmania in the peritesticular tissues, the liver, spleen, bone marrow, lymphatic glands and in leucocytes of the heart blood. Subinoculations were successfully made from mouse to mouse. With material rich in leishmania from the scrotum of an infected mouse 5 dogs were inoculated intradermally. They all developed local lesions in which leishmania were demonstrated.

In his review (Aragâo; this *Bulletin,* Vol. 19, p. 316) of the author's 1921 paper the reviewer stated that it was "just possible, though perhaps improbable, that one or more of the flies had actually fed on a case shortly before they were caught at Biskra." The authors point out that at the time there were no cases of oriental sore either amongst the civil population or the hospital staff. Furthermore, the time of year when the flies were caught was not that in which oriental sore appears. There was thus no possibility that the flies might have fed on a sore as the reviewer suggested.

C. M. W.

Parrot (L.) & Donatien (A.). Infection naturelle et infection expérimentale de *Phlebotomus papatasi* (Scop.) par le parasite du bouton d'Orient. [**Natural and Experimental Infection of** *P. papatasii* **by** *L. tropica.*]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 694–696. [1 ref.]

The authors describe a new and simple method of infecting mice with *Leishmania tropica* and the experimental infection of *Phlebotomus papatasii* from animals infected in this way. To produce infection in a mouse several drops of cultures of *Leishmania tropica* are injected into the skin at two or three points on the tail of an animal. Local infection takes place rapidly, numerous parasites being found at the point of inoculation in 8 or 10 days. As infection extends the tail becomes swollen and may ulcerate. The animals remain in good health, the infection persisting for as much as 11 months.

With mice infected in this way it was decided to attempt infection of sand flies at Biskra. A dissection of 181 wild flies revealed flagellates of the leptomonas type in only one which had been caught in the military hospital where, it is pointed out, there was no case of oriental sore. The flagellates were limited to the stomach of the fly and were most numerous in its anterior part; the hind gut was free from infection. Sand flies were then placed in a cage and infected mice introduced. Of 43 flies subsequently examined 6 were infected. In another experiment flies were permitted to feed only on the tails of the mice; of 29 flies 11 became infected. The flagellates found resembled culture forms of *L. tropica.* The development is rapid, for after 16 hours short flagellate forms can be seen in the blood in the stomach. In 36 hours there are numerous long flagellates often arranged in rosettes. They persist when the blood has been completely digested at 95 hours. The development is limited to the stomach and especially its anterior part. The temperature at Biskra varied from 27° to 32° C. during the experiments.

C. M. W.

ADLER (S.) & THEODOR (O.). **Further Observations on the Transmission of Cutaneous Leishmaniasis to Man from** *Phlebotomus papatasii.*—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 175–194. With 3 plates. [8 refs.]

This paper is a continuation of that previously reviewed (this *Bulletin*, Vol. 23, p. 105). During 1925 sand flies from Jericho to the number of 3,850 were dissected and examined for flagellate infections. Of these 3,624 were females of *Phlebotomus papatasii*, the rest being males of this species or males and females of species belonging to the *minutus* group. Only 4 female *P. papatasii* were found infected. In addition 250 sand flies from Jerusalem, 180 from Mozza and 120 from Haifa (all female *P. papatasii*) were examined and found to be uninfected. The morphology of the flagellates, which is described in detail, shows that they correspond fairly closely with the cultural form of *Leishmania tropica.* Taking into account the 3 infected flies previously reported, in 4 of the flies the flagellates were mainly in the stomach, while in 3 they were in the oesophagus, oesophageal diverticulum, mid gut and hind gut. In one they were also found in the pharynx, buccal cavity and proboscis.

The infectivity of the flagellates in the sand flies was proved by inoculation experiments made on three volunteers. Flagellates from flies were inoculated into two scarified areas on the forearm. In all 3 cases lesions containing leishmania developed. In 2 cases after 25 and 35 days respectively papules containing leishmania appeared on the skin. In the 3rd case it was thought that infection had not taken place, but 4 months after the inoculation there appeared a movable subcutaneous nodule which increased in size. It was punctured at the 7th month and was found to contain leishmania.

Experiments conducted with a view to infecting sand flies from sores are described. Of 168 *Phlebotomus papatasii* which fed on the sore 16 were afterwards found infected. The flies used were wild ones, but owing to the low incidence of natural infection it is safe to conclude that the flies had become infected from the sores. With the flagellates which appeared in the flies 11 inoculations were made in 7 volunteers. Of these, 5 inoculations were made with flagellates which had developed 2 days in the flies, 4 with 5-day flagellates, one with 6-day flagellates, and 1 with 7-day flagellates. In no case did infection take place. The authors incline to the view that the failure was due to the flagellates not having reached the necessary stage of development.

C. M. W.

ADLER (S.) & THEODOR (O.). **The Transmission of Cutaneous Leishmaniasis to Man from Artificially Infected** *Phlebotomus papatasii.* [Correspondence.]—*Nature.* 1926. Nov. 13. Vol. 118. No. 2976. p. 692.

Though the authors succeeded in producing oriental sore by noculating volunteers with the naturally occurring flagellates of *Phlebotomus papatasii* they had hitherto failed to reproduce the sore by inoculation of flagellates from experimentally infected flies on the 2nd, 4th, 5th, 6th and 7th days of infection. Realizing that it was possible that some complete biological cycle might be necessary before the flagellates became infective in the fly, a further series of experiments was instituted. Laboratory-bred flies were fed on a sore produced by the inoculation of the naturally occurring fly flagellates and were dissected on the 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th and 21st days and the flagellates inoculated into volunteers. Up to date, sores have developed in the case of two persons inoculated with 8th day flagellates. Thus a strain of *L. tropica*, for such is the natural flagellate of the sand fly, has been observed through four successive generations of hosts, viz.: (1) Sand fly (naturally infected); (2) Human being infected from (1); (3) Laboratory-bred sand fly infected from (2); (4) Human being infected from (3).

[The authors state that the proof that *Phlebotomus papatasii* is a transmitter of cutaneous leishmaniasis is therefore complete. It has to be remembered, however, that the infections were produced by direct inoculation into the skin. It has yet to be discovered how the sand fly brings about infection in nature. Does it do so by its bite, by being crushed upon the skin, or by the deposit of faeces on the skin, or in some other manner? The matter cannot be regarded as finally settled till the mechanism of natural infection has been determined.]

C. M. W.

ADLER (S.) & THEODOR (O.). **Identity of** *Herpetomonas papatasii* **and** *Leishmania tropica*. [Correspondence.]—*Nature*. 1926. July 17. Vol. 118. No. 2959. p. 85.

In this note the authors recall the fact that they have already reported the successful production of oriental sore in 3 individuals by inoculating them with the leptomonad flagellates from naturally infected *Phlebotomus papatasii*. In view of the fact that NOGUCHI and KLIGLER have both shown that homologous sera can be prepared for the cultural forms of the various species of *Leishmania*, viz., *L. tropica*, *L. donovani* and *L. braziliense*, they decided to apply this test to the leishmania from the experimental sores and the naturally occurring sores. The result of the investigation is that the leishmania from the experimental sore and hence the naturally occurring flagellates of the sand fly are serologically identical with the parasites of the naturally occurring sores of both Palestine and Bagdad.

C. M. W.

LLAMBIAS (Joaquin) & MOSTO (Domingo). Leishmaniosis cutanea americana. Estudio histopatológico. [**American Dermal Leishmaniasis. Histological Study.**]—*Semana Méd.* 1926. Aug. 26. Vol. 33. No. 34. (1702.) pp. 536–539. With 3 text figs.

—— & ——. Etude histo-pathologique de la leishmaniose cutanée américaine.—*C.R. Soc. Biol.* 1926. Sept. 21. Vol. 95. No. 27. pp. 823–824.

An histological examination of the lesions of American cutaneous leishmaniasis reveals the fact that there is a marked proliferation of the Malphigian layer of the skin which results in the formation of prolongations into the corion which is converted into granulation tissue which invades the dermis. In many cases the prolongations become disconnected with the Malphigian layer, forming epithelial islets with concentric arrangement of the cells as in epithelioma. The dominant cellular elements are of the lymphocytic or large mononuclear type, while giant cells, eosinophiles and polynuclears are also present. Sometimes the eosinophiles predominate over all other cells.

C. M. W.

JEANSELME (E.). Un cas de bouton d'Orient contracté à Marseille. [**Oriental Sore contracted at Marseilles.**]—*Bull. Acad. Méd.* 1926. July 13. Year 90. 3rd Ser. Vol. 95. No. 28. pp. 56–58.

—— & BURNIER. Un cas de bouton d'Orient.—*Bull. Soc. Française Dermat. et Syph.* 1926. July. No. 7. pp. 479–480. With 1 fig.

The papers describe a case of oriental sore in a Russian sailor who during 1921–1922 was in the Crimea, Turkey and Tunis. He left Tunis on July 15th, 1922, and came to Marseilles. During the whole of 1923 he worked in France and was in the Baltic from January to October, 1924, after which he returned to France. Two months after his return to Marseilles the lesion developed over the left eye-brow. It appears that the infection must have taken place in Marseilles, unless one is willing to admit an incubation period of about 3 years. Many refugees suffering from oriental sore came to Marseilles after the war and they may have been responsible for the spread of the infection. Another case is mentioned of an Armenian who left Aleppo in August, 1924, for France where she developed oriental sore, the lesions of which first appeared in November, 1925.

C. M. W.

WILSON (F. P.) & SHREWSBURY (J. F. D.). **A Report on a Case of Espundia.**—*Brit. Jl. Dermat. & Syph.* 1926. June. Vol. 38. No. 6. (452). pp. 231–241. With 9 text figs.

The paper describes a case of espundia in a man who had resided in Brazil. There was involvement of the nasal and buccal mucosae as also the tissues around the urethral orifice. Active anti-syphilitic treatment carried on for several years did not lead to any improvement. Three intramuscular injections of tartar emetic were given and though the treatment had to be discontinued owing to profound reaction it produced the first definite signs of improvement. After radium and X-ray treatment had been tried further injections of tartar emetic followed by Von Heyden "471" were given. The patient steadily improved and was finally discharged. The remarkable response to antimony treatment justified the diagnosis.

C. M. W.

**Pupo** (J. Aguiar). Traitement de la leishmaniose des muqueuses par l'éparseno (amino-arséno-phénol de Pomaret). Ses possibilités d'emploi dans le traitement du kala-azar. [**Treatment of Mucosal Leishmaniasis by Eparseno.**]—*Bull. Soc. Path. Exot.* 1926. May 12. Vol. 19. No. 5. pp. 331–335.

——. Leishmaniose tegumentar. Epidemiologia, prophylaxia e tratamento da leishmaniose americana.—*Sciencia Med.* 1926. Aug. 31. Vol. 14. No. 8. pp. 387–409. With 2 plates. [15 refs.]

——. Le traitement des leishmanioses par l'amino-arséno-phénol. —*C.R. Soc. Biol.* 1926. Oct. 22. Vol. 95. No. 29. pp. 993–994.

The three papers describe the treatment of S. American leishmaniasis with " eparseno," which is Ehrlich's 592 (di-oxy-di-amino-arsenobenzene). The second paper in addition gives a general review of the subject, with special reference to the various treatments which have been advocated.

The advantages of treatment with " eparseno " is that the drug can be administered intramuscularly. Two cases, both of which had involvement of the nasal and oro-pharyngeal mucosae, were completely cured. The first case was in an infant 14 months old. It received a course of 8 intramuscular injections of 1 to 3 centigrams of the drug. This brought about a marked improvement, a complete cure following a repetition of the course. The second case was completely cured by a course of 15 injections of 12·5 centigrams. A third more serious case has received 2 such courses with a two months' interval. After a similar interval a third course is in progress, and the improvement is so marked that it is safe to predict that a complete cure will be obtained in this case also. The good results obtained warrant a more extensive trial of this method of treatment in S. American and other forms of leishmaniasis.

C. M. W.

Mazza (Salvador) & Bernasconi (Vicente). Ensayos de tratamiento de la leishmaniosis tegumentaria americana por el " Bayer 205." (Nota preliminar.) [**Treatment of American Dermal Leishmaniasis by " Bayer 205."**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 96–99. With 2 figs.

Two cases of American leishmaniasis were treated with intravenous injections of " Bayer 205 " in doses of half a gramme. One case was given six, and the other five injections. The results obtained are sufficiently encouraging to justify the trial of the treatment in a larger series of cases.

C. M. W.

Mazza (Salvador) & Bernasconi (Vicente). Ensayos de tratamiento de la leishmaniosis tegumentaria americana por el Stovarsol sódico por via intravenosa. (Notas preliminares.) [**Treatment of American Dermal Leishmaniasis by Stovarsol.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 112–117. With 6 figs.

Three particularly severe cases of American leishmaniasis which had resisted tartar emetic and other medication were treated with intravenous stovarsol. After 13 or 14 injections definite improvement was noted. The drug is evidently worth trying on less severe cases with a view to estimating the permanency or otherwise of the results obtained.

C. M. W.

LINDEMBERG (Adolpho). Novos tratamentos antimonaes da leishmaniose cutanea. [**Antimony Treatment of Dermal Leishmaniasis.**]—*Ann. Paulist. Med. e Cirurg.* 1926. May–June. Year 14. Vol. 17. Nos. 5 & 6. pp. 59–60.

In the treatment of cases of South American leishmaniasis in which the naso-pharyngeal mucosa is involved, the author has had good results from intravenous injections of a 5 per cent. solution of antimosan in doses of 4 to 8 cc. given 2 or 3 times a week. Of 10 cases treated only one proved refractory. During a period of 7 months 18·4 gm. of antimosan were administered, without producing any untoward results.

C. M. W.

PATERSON (Guillermo). Sobre métodos modernos de tratamiento de la leishmaniosis tegumentaria americana. [**Modern Methods of Treatment of American Dermal Leishmaniasis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 68–73.

In the treatment of the leishmaniasis of the skin and mucosae in the Argentine the author finds that, though intravenous injections of tartar emetic give good results, it is sometimes advisable to supplement this treatment by local applications and injections of phosphorated oil, as recommended by CASTELLANI for the treatment of oriental sore, and by ionization of the sore, for which an antimony electrode attached to the positive pole of the continuous current is employed by applying it directly to the sore.

Describing the method of transmission both Phlebotomus and Simulium are considered, and it is noted that flagellates of the herpetomonad (leptomonad) type have been found in the latter. Flies fed on sores have so far yielded only negative results.

C. M. W.

RAETZ (Erico). Tratamiento de la leishmaniosis por el yodobismutato de quinina. [**Treatment of Dermal Leishmaniasis by Iodobismuthate of Quinine.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 150–151.

South American leishmaniasis resembles syphilis in that it is a disease which is produced by way of the blood stream. There is a primary chancre-like lesion which becomes transformed into an extensive ulcer. After a variable interval the lesions of the skin of the face and mucosae of the mouth and nose become involved indicating a tertiary stage. As in syphilis, treatment both local and general must be energetically carried out. Injections of tartar emetic having failed to give good results, the author was led to try iodobismuthate of quinine which was administered by daily injections of 0·15 gram during one month. This gave better results as regards the mucosal lesions and completely cured the cutaneous ulceration of the legs.

C. M. W.

TRUFFI (M.). Sulla leishmaniosi cutanea. [**Dermal Leishmaniasis.**]—*Giorn. Ital. di Dermat. e Sifil.* 1926. Apr. Year 61. Vol. 67. No. 2. pp. 847–849.

The author has encountered a further 8 cases of oriental sore in eastern Sicily (this *Bulletin*, Vol. 23, p. 108). The paper is of interest in that during treatment by intravenous tartar emetic a mistake led to the injection of 45 and 55 centigrams into two patients. This was followed by severe toxic phenomena—irritation of the cardiovascular and nervous systems, resulting in collapse, headache, torpor, somnolence and loss of consciousness. The digestive system was not seriously affected though there was at first gastralgia and vomiting followed by nausea during the first 24 hours. In one of the two albumin was present in the urine. In the other case there was slight icterus after the second day and enlargement of the liver with urobilin and traces of bile pigment in the urine. The urine of both was examined for antimony on the 5th day, but none was found.

C. M. W.

PARROT (L.) & LESTOQUARD (F.). Sur quelques détails de la structure des leishmania. [**Details of the Structure of Leishmania.**]—*Arch. Inst. Pasteur d'Algérie.* 1925. Dec. Vol. 3. No. 4. pp. 327–332. With 2 plates (1 coloured). [7 refs.]

By employing a special technique the authors have been able to study some of the minute structural details of *Leishmania tropica*, which are not always evident in films prepared in the usual way. Two methods of preparation are described. Films, presumably the ordinary dried films, containing parasites are fixed in Schaudinn's fixative (alcoholic solution of corrosive sublimate) for 10 minutes and then washed free of fixative by 2 per cent. alcoholic iodine solution and finally in 95 per cent. alcohol to remove all traces of iodine. The films are then dried. The film is then covered with horse serum for ten minutes after which it is dried rapidly in the air. It is then stained for an hour in Giemsa stain 1 in 10. It is important to use in fixation only sublimate solution which has been prepared at least 24 hours before and, in staining, distilled water which is exactly neutral in reaction. In the second method films are fixed in alcoholic iodine solution for 10 minutes and washed in 95 per cent. alcohol till free of iodine. The films are dried, treated with horse serum and again dried as described above and stained with a 10 per cent. solution of trieosinate of methylene (Crétin's formula) for an hour, after which they are washed and dried.

Both methods bring out clearly the minute structure of the parasites, especially the rhizoplast and the superficial capsule. The rhizoplast has been previously described by various observers, but has not always been evident in all the parasites. In films stained by the above procedures it is always distinct and has to be regarded as one of the essential parts of the organism. When the kinetoplast divides the rhizoplast becomes thicker and appears to divide longitudinally, the last part to divide being the end in contact with the capsule of the parasite. Another feature which is brought out is the capsule itself which is proved to be a definite structure because there occur in the films numerous empty capsules, as also capsules containing the kinetoplast alone or this structure and the rhizoplast. The various structures described are depicted in two plates, one of them coloured.

C. M. W.

MAZZA (Salvador). Existencia de la leishmaniosis cutánea en el perro en la República Argentina. (Nota preliminar.) [**Dermal Leishmaniasis in a Dog in Argentina.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 147–149. With 1 text fig.

It was noted that dogs in the neighbourhood of San Martin de Tabacal (Salta) were liable to ulceration of the base of the ears. In scrapings from an ulcer of one of the animals leishmania were found. The animal was killed and examined. There was no ulceration of the mucosae, while the spleen, liver and bone marrow revealed no parasites. This is the first case of cutaneous leishmaniasis to be recorded in the dog in the Argentine. PEDROSO had previously seen a similar condition in dogs in Brazil.

C. M. W.

i. ESCHBACH (H.). Kala-azar chez un adulte. [**Kala Azar in an Adult.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. Nov. 18. Year 42. 3rd Ser. Vol. 50. No. 34. pp. 1568–1570. [3 refs.]

ii. LÉPINE (Pierre). Trois cas syriens de kala-azar infantile. [**Three Cases of Infantile Kala Azar from Syria.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 429–431.

iii. HITTI (Joseph K.). **Infantile Kala Azar in Syria.**—*Jl. Amer. Med. Assoc.* 1926. Oct. 16. Vol. 87. No. 16. p. 1302. [1 ref.]

iv. PATARINO (G. B.). La leishmaniosi a Bari. [**Kala Azar at Bari.**]—*Pediatria.* 1926. Dec. 1. Vol. 34. No. 23. pp. 1323–1325. [4 refs.]

i. The paper describes a case of kala azar in a 24-year old student in Paris. The illness commenced at the beginning of 1925. Previously he had lived in Tunis from April, 1921, to December, 1922, and after that returned to France and had spent a month and a half at Antibes near Cannes whence, in February, 1923, he went to Dijon and finally returned to the centre of France and Paris.

ii. The author describes three cases of infantile kala azar in Syria. The first was diagnosed in the American Hospital at Beyrout. Inquiry showed that the child had come from the district of Djebail in the Libanus where it was suspected a focus of the disease might exist. Investigations of the locality revealed two further cases. This appears to be the first record of kala azar in Syria.

iii. The paper gives a brief description of 5 cases of infantile kala azar in Beyrout in Syria. It appears that 3 of the cases have been reported in the paper by Pierre LÉPINE reviewed above.

iv. Two cases of infantile kala azar occurring at Trani and Bari on the Italian coast about 100 miles north-west of Brindisi.

C. M.W.

i. AGRONICK (A.). Au sujet de l'épidémiologie et de la clinique de la leishmaniose cutanée. [**Epidemiology and Symptomatology of Dermal Leishmaniasis.**]—*Russian Jl. Trop. Méd.* 1926. No. 5. French summary p. 79. [In Russian.]

ii. COOK (Albert R.) & STONES (R. Y.). **A Case of Oriental Sore in an Indian in Uganda.**—*Kenya Med. Jl.* 1926. Aug. Vol. 3. No. 5. pp. 132–133.

iii. VERSARI (Attilio). Un caso di bottone di Oriente in Provincia de Napoli. Contributo clinico ed istopatologico. [**Oriental Sore in Naples Province.**]—*Pediatria.* 1926. Sept. 15. Vol. 34. No. 18. pp. 977–1000. With 4 text figs. [111 refs.]

i. As a result of the movements of troops during 1914–1922 oriental sore appears to have become more frequent, the infections which had taken place in the southern districts of Russia accounting for the notification of cases in Moscow.

ii. A case of oriental sore was noted in an Indian who was in Basrah in October, 1924. He returned to India, whence he sailed for Uganda on January 17th, 1925. The sore, which occurred on the cheek, first appeared in September, 1925.

iii. The case of oriental sore described is the first to be recorded from the province of Naples.

C. M. W.

NICOLLE (Charles). Quelques considérations sur la leishmaniose tégumentaire américaine.—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 108–113. With 4 figs. [*v.* this *Bulletin*, Vol. 23. p. 584.]

PARROT (L.) & FOLEY (H.). Le bouton d'Orient en Algérie, remarques étiologiques et épidémiologiques.—*Arch. Inst. Pasteur d'Algérie.* 1925. Dec. Vol. 3. No. 4. pp. 333–343. [23 refs.] [*v.* this *Bulletin*, Vol. 23, p. 106.]

## MISCELLANEOUS.

FERNÁNDEZ (Antonio A.). Granuloma ulceroso perianal por un clamidozoario? **[Perianal Ulcerous Granuloma due to Chlamydozoa?]**—*Semana Méd.* 1926. Mar. 25. Vol. 33 .No. 12 (1680). pp. 585–600. With 8 text figs. [11 refs.]

The author describes at great length the case of a man, 29 years of age, with a granulomatous condition of the border of the anus, in parts ulcerating. Smears made from the surface and also from the depth showed staphylococci and small bodies from 0·2 to 1·5 microns in length, some bacillary, others round or pyriform, some intracellular, in the cytoplasm and nucleus of epithelial and leucocytic cells, others free. By inoculation of the emulsified tissue into guineapigs he was able to reproduce the condition and to see in them the same bodies. He discusses the diagnosis of the affection and excludes tuberculosis, syphilis, granuloma venereum, leishmaniasis and purely inflammatory lesions, and concludes that it is an ulcerating granuloma produced by chlamydozoa, transmissible to guineapigs, and cured by novarsenobenzol. The last part of the paper is occupied by a discussion as to the place of chlamydozoa in nature.

H. Harold Scott.

STENHOUSE (H. M.). **The Significance of Cholesterol in Tropical Hydrocele.**—*Amer. Jl. Trop. Med.* 1926. Mar. Vol. 6. No. 2. pp. 143–151. [4 refs.]

This study was made in St. Croix, one of the Virgin Islands, where hydrocele is 30 or 40 times as common as in America, and *Filaria bancrofti* infests practically the entire population at some time in their lives. Cholesterol in hydrocele fluid has been usually regarded as a secondary degenerative product, but the author holds a different view [which, however, he has not succeeded in making clear to the reviewer]. Arteriosclerosis, also very common in St. Croix, he would attribute to the same cause as hydrocele, cholesterol taking a part in its production.

A. G. B.

SMITHIES (Frank). **Protozoiasis occurring in Temperate Zone Residents. A Study of 265 Instances with a Discussion of the Associated Digestive Malfunction.**—*Amer. Jl. Trop. Med.* 1926. Jan. Vol. 6. No. 1. pp. 1–45. With 10 text figs. [19 refs.]

This paper is based on material that has been accumulating during the last 12 years, and its main interest is for the physician. The material is collected from 3,780 patients in the northern temperate zone who came for relief of digestive disorders. Protozoa of some sort were discovered in the stools of 265 of them (7 per cent.). The age of the protozoa-patients ranged from 7 to 81 years; 172 were males and 93 females. The species of protozoa recognized were *Trichomonas intestinalis* in 78 instances, *Cercomonas intestinalis* in 71, *Chilomastix mesnili* in 22, *Entamoeba histolytica* in 38, *E. coli* in 19, undetermined Entamoebae in 3, *Balantidium coli* in 7, Giardia in 14. The frequency with which the initial dyspepsia could be traced to the drinking of dirty water, or to the consumption of dubious garden produce, or to the seasons of plentiful fruit and vegetables is emphasized.

Diarrhoea was the leading symptom in 205 of the 265 protozoa-patients, and the author proposes a theory that it is due to poisons (toxic amines) produced by the catabolic action of intestinal bacteria of the colon group upon the dead protozoa. Constipation was a leading symptom in 13 patients, and these patients were specially " toxic." The stools were normal in 17. Abdominal tenderness was most common in the ilio-caecal region, and might also be detected in the region of the gall-bladder. In 188 cases the red-cell-count was below four million, and in 29 the anaemia was of the pernicious type; in 34 cases eosinophilia ranged from 6 to 21 per cent. Gastric and pancreatic deficiency were common occurrences. Proctoscopic and roentgen-ray evidence are discussed.

The author's general conclusion seems to be that, aside from the notoriously offensive *Entamoeba histolytica, Balantidium coli,* and Giardia, and apart from the possibilities of toxic irritation discussed, such flagellates as Trichomonas and Chilomastix may exercise a definite pathogenous aggravation in cases where the intestine is already damaged from some other cause.

A. A.

ROEGHOLT (M. N.). Rectaal-ulcera en rectaal stenosen. Een klinische Studie. [**Rectal Ulcer and Rectal Stenosis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 2. pp. 278–299. With 4 figs. on 1 plate. [21 refs.]

The etiology of rectal ulcer and stenosis is still very obscure. These conditions are far more prevalent in women than in men, and always situated 3–4 cm. above the anal opening. This indicates that the cause is not an intra-intestinal one, and accordingly syphilis, tuberculosis and dysentery are excluded (though they may produce ulcer and stenosis elsewhere in the intestine). The different anatomical condition of the perineum in man and woman must account for the different predisposition to this affection.

Roegholt gives the reasons for which he incriminates soft chancre as the cause of this affection. The infection of the rectum may be either a direct one by the discharge flowing along the anus, or the infection may reach the rectum by perforation of the recto-vaginal septum, or it may be carried by the infected lymph from the primary sore to the ano-rectal lymph glands and from there to the lining of the rectum in cases in which the inguinal glands are inflamed and blocked.

Roegholt gives detailed description of the clinical picture. Dilation of the stricture never succeeds above a certain limit. In cases of narrow stricture, the author makes an anus praeternaturalis, eventually followed by extirpation of the rectum after a sufficient lapse of time to allow the patient to recuperate. He hopes that the future may bring a rational antibacterial treatment of the affection founded upon the better knowledge of its etiology.

W. J. Bais.

CATANEI (A.). La langue noire pileuse : sa parasitologie, réflexions sur sa pathogénie. [**Hairy Black Tongue : its Parasitology and Pathogeny.**]—*Arch. Inst. Pasteur d'Algérie.* 1925. Dec. Vol. 3. No. 4. pp. 379–393. [19 refs.]

The author gives the history of black tongue, with an account of the parasites which have been associated with it, a careful description of one case with laboratory details of a Cryptococcus and a Monilia isolated, and reaches the conclusion that none of the organisms described plays a specific part in its causation. The papers cited are almost all French.

A. G. B.

WELLS (C. R.) & COOPER (G. W.). **Black Tongue.**—*U.S. Nav. Med. Bull.* 1926. Jan. Vol. 24. No. 1. pp. 12–30. With 2 figs.

A detailed and learned account of the rare condition known as black tongue, in which subjective symptoms are mild or absent and health is unimpaired. The authors studied two cases. It is described as "primarily a hyperkeratosis of the filiform papillae with the deposit of pigments upon and between the enlarged papillae." The hairy papillae may reach a length of one quarter inch. There is little evidence for a parasitic origin. A similar condition was induced by the application of tincture of nutgalls to the tongue of a normal person three times a day. [The value of the paper would have been enhanced by a bibliography.]

A. G. B.

METZGER (Emy). Studien ueber den Verlauf zweier gleichzeitig gesetzten Infektionen (Malaria und Recurrens). [**The Course of Two Simultaneously Transferred Infections (Malaria and Relapsing Fever).**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. June 28. Vol. 47. No. 6. pp. 545–554. [8 refs.]

A paper from the Psychiatric Clinic at Frankfort. In three cases of general paralysis the patient was infected with malaria and relapsing fever, either simultaneously or in succession, and the course of the temperature, blood findings, and results of inoculations to mice are given. The following conclusions were reached :—

If one infects a paralytic with malaria and relapsing fever simultaneously, the malaria holds the relapsing fever in a depression (Depression immunity of MORGENROTH) ; the relapsing fever does not run its normal course till the malaria is cut short. The result is the same if one infects with relapsing fever after the third malarial relapse. If, however, the relapsing fever is first introduced and malaria after the first recurrence, when the malaria develops the spirochaetes disappear from the blood and do not become demonstrable again till the malaria is cut short, but in the author's case there were no further febrile attacks.

A. G. B.

i. EICHELBAUM (H. R.). **Lobar Pneumonia.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company. Boston, Mass.* 1925. pp. 202–205.

ii. WALKER (H. M.). **Lobar Pneumonia.**—*Ibid.* pp. 206–207.

iii. MENK (W.). **Report on the Use of Mercurochrome Intravenously in Lobar Pneumonia.**—*Ibid.* pp. 213–217.

i. Lobar pneumonia is responsible for the highest mortality of any disease in Almirante Hospital, Panama. The deaths in 1924 from all cases were 105; pneumonia 33, chronic nephritis 12 and the remainder about equally divided between tuberculosis, heart disease and malaria. Of 200 deaths in 1924 and 1925, 57, or 28·5 per cent., were due to pneumonia; hookworm, nephritis and malaria were common complications.

Methods of treatment consisted in—digitalis, intramuscular camphorated oil injections, mercurochrome intravenous injections, intramuscular milk injections, with mortality ranging from 48 per cent. (camphorated oil) to 26 per cent. (milk). Mercurochrome tended to produce lung infarction through blood destruction and consequent formation of emboli; small doses are favoured.

ii. Dr. Walker of Puerto Castilla Hospital, Honduras, finds that pneumonia accounts for 25 per cent. of the mortality at that hospital. In 1924 and 1925 mercurochrome was given intravenously "with a considerable improvement in the mortality rate." The mortality among 84 cases treated with mercurochrome was 27 per cent., and among 16 cases not so treated 43 per cent., or 30 per cent. for the whole series, but it is admitted that some of the latter category were too ill on admission for the administration of the drug. The best results were obtained with doses sufficiently large to cause chill, high fever, vomiting and diarrhoea.

iii. Between June and December, 1925, Dr. Menk treated 60 cases of lobar pneumonia in the Santa Marta Hospital, Colombia, with mercurochrome given intravenously in 1 per cent. solution in doses of 8 to 25 cc.; the mortality was 25 per cent. In the corresponding period of 1924, 164 cases were treated otherwise, with a death rate of 34 per cent. The author thinks that the untreated severe cases about balance the untreated mild cases.

AGE AND MORTALITY—WITH AND WITHOUT MERCUROCHROME.

| Age. | 1924—Without Mercurocrome. | | 1925—With Mercurochrome. | |
|---|---|---|---|---|
| | | per cent. | | per cent. |
| 15 to 25 years, inclusive | 62 cases—Mortality | 30·65 | 17 cases—Mortality | 5·88 |
| 25 to 35 ,, ,, | 56 ,, — ,, | 26·8 | 22 ,, — ,, | 31·8 |
| 35 to 45 ,, ,, | 30 ,, — ,, | 50·0 | 17 ,, — ,, | 29·0 |
| Above 45 ,, ,, | 16 ,, — ,, | 42·5 | 3 ,, — ,, | 33·3 |
| | | | 1 case, age not recorded, died. | |

He calls attention to the low mortality rate in the 15 to 25 age series treated with mercurochrome [a small series]. From other data he deduces the importance of early administration. Later, the resistance "is too low for us to expect striking results from a drug which probably owes its therapeutic value to its activating the defensive power of the organism." He finds that one can rarely give 15 cc. of 1 per cent. mercurochrome solution to an average adult case of pneumonia without danger of producing pronounced reaction or toxic symptoms. A series of 12 treated cases was carefully studied to see the effect of the drug on the white blood and differential leucocyte counts, and the results are tabulated, the counts being made before the treatment and 3, 6, and 24 hours after. The general reaction was found to resemble closely that produced by the so-called non-specific stimulation therapy. In all cases the total leucocyte count was increased, the increase ranging from 2,000 to 20,000 three hours after the injection.

The conclusion is that mercurochrome is an additional useful drug in pneumonia therapy, but far from ideal. Most of the native labourers are weakened by chronic infections, parasites and poor living, and these matters must be looked to.

A. G. B.

LAGRANGE (E.). A propos de quelques observations d'abcès de la rate. [**Some Observations of Splenic Abscess.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 421–426. [12 refs.]

This paper is based on the recollection of three cases which occurred at Usumbura, north of Lake Tanganyika, in the East African campaign in 1916, and on a study of the published papers. The three cases occurred in 15 autopsies of natives. In two, chocolate pus, without odour, filled the abdominal cavity, and the spleen was diffluent; in the third, there were numerous pea-sized abscesses. The spleens were not notably large and no cause was revealed by blood examination; no bacteriological search was made. The author refers to the observations of WALLACE in Rhodesia (this *Bulletin*, Vol. 19, p. 616) and of LOEVENBRUCK in Katanga (*l.c.* Vol. 22, p. 673); the former reported the occurrence of some hundreds of cases* between 1922 and 1924. The author's three cases occurred during a violent epidemic of tick fever in troops which were afterwards transferred to Katanga, and he notes the close association between this region and Northern Rhodesia. (Incidentally, we learn that later in the year, Ornithodorus were found in the bark of a mango tree, which grew close to the site of a cook-house burnt by the Germans "a long time before" because of tick infestation.) The author would be satisfied with the relapsing fever origin of these cases, had not another autopsy at the same time revealed swollen and ulcerating Peyer's patches, evidence of enteric. He recalls that spirochaetes were discovered in one of WALLACE'S cases and notes that typhoid bacilli have been found in splenic abscesses by two authors. He concludes that under the influence of unknown factors bound up with geographical factors, certain viruses may acquire unusual tropisms. [He makes no reference to the gas noted by both WALLACE and LOEVENBRUCK, nor to a possible amoebic origin of such abscesses. It seems probable that there are several independent causes of splenic abscess in Tropical Africa.]

A. G. B.

PANAYOTATOU (Angélique). Rougeole et dysenterie. Sur une épidémie de rougeole à Alexandrie. La rougeole et ses complications aux polycliniques des femmes et enfants (1925–1926). [**Measles and Amoebic Dysentery at Alexandria 1925-6**].—*Rev. d'Hygiène.* 1926. June. Vol. 48. No. 6. pp. 558–562.

It is well known that the commonest complication of measles is broncho-pneumonia. At Alexandria in the epidemic mentioned amoebic dysentery took the first place, coming on during convalescence. Of 132 cases of measles seen at two polyclinics, 55 were followed by amoebic dysentery, microscopically confirmed in 35 and considered proved by the curative effect of emetine in 10; only 25 cases were complicated by bronchitis. It is stated that the majority of the cases were under one year, and of these 90 per cent. died. These children were being suckled, and the author thinks that the amoebic infection was derived from the soiled hands of the mothers. A. G. B.

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* An instance of the exaggerations which creep into abstracts of medical papers. WALLACE speaks of 49 cases, and "several cases in other parts of Northern Rhodesia."

SHANKS (G.) & KHAN (G. P.). **The Diagnosis of Typhoid-like Fevers, with Special Reference to Typhoid and Kala-Azar.**—*Indian Med. Gaz.* 1926. July. Vol. 61. No. 7. pp. 324–327. With 3 charts. [2 refs.]

The authors note that when enteric fevers occur in the temperate zone, where many have been inoculated, diagnosis is not easy unless a positive blood culture is obtained. In Bengal diagnosis is difficult for another reason, viz., the clinical similarity between typhoid and kala azar. At the laboratory of the Medical College, Calcutta, the following procedures are carried out:—

"(1) Culture of the blood. (2) Blood serum reactions. (3) Cultures of urine and faeces. (4) Microscopical examination of the blood. (5) Puncture of the spleen, and rarely of the liver."

"(1) Ten cubic centimeters of blood are removed, and seven cubic centimeters of this are put in a tube containing about 10 cc. of normal saline, with 1 per cent. of sodium citrate. This tube is brought to the laboratory and the major portion is transferred to a flask containing 50 cc. of 2 per cent. glucose broth; a small portion is left for culture on N.N.N. medium. The remainder of the blood—about three cubic centimeters—is put in a sterile tube for separation of the serum. This simplified procedure has two advantages; it is not necessary to carry around the flask of easily contaminated medium, and it enables cultures for flagellates and other organisms to be made with the same specimen of blood and from the same tube.

"The time elapsing between the taking of the blood and the transfer of the citrated blood to the flask of 2 per cent. glucose broth does not usually exceed half an hour. When the citrated blood has been added to the glucose broth the final dilution of sodium citrate is approximately 0·15 per cent., which is about the optimum advocated by Wright after experiments in cases of sub-acute infective endocarditis. By this method organisms of the typhoid group, streptococci, pneumococci and meningococci have grown well in blood cultures."

(2) The blood serum reactions are Napier's aldehyde reaction and the agglutination reaction. The latter is carried out by Professor DREYER's method. A table is given showing that in a series of 197 cases in which a definite diagnosis of kala azar was made, the Widal reaction was entirely negative. Both these tests are in the authors' opinion very reliable.

They have had five cases in which typhoid was followed by kala azar and three in which the reverse occurred. Temperature charts of two of these cases are given. A. G. B.

JAMISON (S. Chaille). **Pernicious Anemia in the North American Negro.**—*Southern Med. Jl.* 1926. Aug. Vol. 19. No. 8. pp. 583–584. [13 refs.]

Of 122,524 patients admitted to the Charity Hospital of New Orleans in six years 25 per cent. were negroes; pernicious anaemia was diagnosed 42 times in white patients and 12 times in the negro, but it is stated that all with any trace of negro blood are placed in the latter category. A. G. B.

GREEN-ARMYTAGE (V. B.). **Infantile Cirrhosis of the Liver.**—*Indian Med. Gaz.* 1926. Sept. Vol. 61. No. 9. pp. 441–444.

A practical paper from the Second Professor of Gynaecology, Calcutta Medical College, giving a detailed account of this Indian disease and its treatment. He has seen 63 advanced cases in the last seven years, 27 in Europeans or Anglo-Indians, 30 in Hindus and six in Mahomedans. The ages have been between 5 months and 3½ years; 17 were on the breast. In all the remainder there were obvious dietetic errors, and 33 were being fed on patent foods, supplemented by sweets. The additional work thus thrown on the liver causes enlargement due to swelling and congestion of the cells, and, later, contraction, in consequence of the reactive intercellular fibrosis; the author calls the disease intercellular hepatic cirrhosis.

Etiology.—(1) Deficiency in vitamins of the pregnant women's diet, reacting both on the mammary secretion and the endocrine system of the foetus. (2) Pyorrhoea, anaemia and constipation in the mother, leading to secretion of a milk " lacking in stimulatory hormones," calcium, iodine, etc. (3) Overfeeding of the child. (4) The feeding of milch animals for several months of the year on dry fodder.

Symptoms.—The onset is insidious and in a minor degree the disease occurs more frequently than is supposed. The early symptoms are low fever, with constipation and earthy offensive stools. The liver is large and tender, the skin dry, the feet often oedematous; later there is ascites and the liver shrinks. In every case the diagnosis of kala azar, syphilis and malaria was excluded.

Prevention.—The mother must be fed properly in the antenatal and nursing periods, and Major Green-Armytage gives a detailed list of what she may and may not eat. When weaning occurs, the milk affording animal must be properly fed. Avoid patent foods and sweets for the child. Give 2–3 oz. fresh fruit juice daily. " All children, European or Indian, should be allowed out in the sun from 6 to 9 a.m., and from 3 to 6 p.m.—that is when the ultra-violet rays of the sun are at their ' maximum '." As vegetables in Bengal are wanting in salts, add iodized salt, e.g., iodosol, to all food.

The treatment of the child is described in minute particulars for the first 14 days; it begins with barley water or rice water on the first day and skimmed, or fat-free, milk from the second day. Plenty of fruit juice is given. A few days semi-starvation will cure the very early cases.

Prognosis.—When cases are seen early, and the parents attend to instruction, recovery occurs in 6 to 10 weeks. Later cases with jaundice or ascites never recover.

A. G. B.

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DEN HARTOG (B. J. C.). Een geval van lymphatische leukaemie bij een Javaansche vrouw. **[A Case of Lymphatic Leukaemia in a Javanese Woman.]**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 2. pp. 252–259. With 5 figs. on 1 folding plate. [5 refs.]

Leukaemia is apparently a very uncommon disease in the Malay race. The author describes a case in a Javanese woman who died during sleep without previous complaint of any importance. Post-mortem examination showed a lymphatic leukaemia marked by much heterotopic growth in pleura (with haemorrhagic exudate), heart, ovary, uterus and salivary glands.

Locally a neoplastic character was noticed. At the site of the thymus gland a tumour was found without any trace of thymus tissue, but containing lymphoglandular and fat tissue.

W. J. Bais.

SMITH (E. C.). **Cancrum Oris in a Case of Leukaemia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Jan. 21. Vol. 19. No. 7. pp. 394–396.

A Kroo-boy was admitted to hospital with cancrum oris and died the same night. An account is given of the macroscopic and microscopic appearances of the organs and tissues. The leukaemia was myelogenous. Both diseases are rare in Lagos.

A. G. B.

LIÉGEOIS (M.) & FOULON. Septicémie méningococcique à type pseudopalustre améningitique. Guérison obtenue par la sérotherapie intraveineuse. [**Meningococcus Septicaemia of Pseudo-malarial Type without Meningitis.**]—*Arch. Méd. et Pharm. Milit.* 1926. Jan. Vol. 84. No. 1. pp. 51–56. With 1 chart.

During an epidemic of cerebrospinal meningitis at Coblenz, a soldier was admitted to hospital on March 14th with "loss of flesh and erythema nodosum." The history was of frequent febrile attacks since January 25th, sometimes daily, sometimes separated by one or two days, pains in the joints, and eruptive patches. His general state was good, and he made no complaint of feeling ill. On the third day a blood culture revealed the diplococcus, and no malarial parasites could be found. Serum treatment checked the fever and after a second series of injections the patient recovered, the temperature becoming normal on April 14th. The duration of the illness was nearly three months. There was never any symptom of meningitis. Many similar cases, the authors say, have been published.

A. G. B.

GLÖKLER (Fritz). Ein Beitrag zur Schweineborstenkrankheit. [**Pig's Bristle Disease.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Apr. 1. Vol. 30. No. 4. pp. 157–160.

A condition described by the Chinese in which pig's bristles are said to grow in the skin of the chest and back ; unless they be removed, the quacks say, the issue is fatal. In a case seen by the author a decoction of fowl's feathers was rubbed on the skin and the "pig's bristles" proved to be portion of feather lying on, not in the skin. The "disease" was reproduced on the author's arm and that of his cook.

A. G. B.

CASTELLANI (Aldo). **Importance of Symbiosis, or Close Association of Different Species of Organism, in the Production of certain Biochemical Phenomena and in the Causation of certain Diseases and certain Symptoms of Diseases.**—*Jl. Amer. Med. Assoc.* 1926. July 3. Vol. 87. No. 1. pp. 15–22. With 5 text figs. [2 refs.]

On the text that "symbiosis has so far attracted little attention from medical men and bacteriologists," the author develops the argument that symbiosis may play an important part in biochemical phenomena and in the causation of specific diseases. As examples of such diseases he mentions trichomycosis rubra and nigra, and stomatitis cryptococcobacillaris; as examples of symptoms of disease caused by symbiosis he gives the mousy smell in favus, the honey-yellow crusts in yaws, the tympanitis in some cases of typhoid. In his applications the author limits the term "symbiosis" to associations of different forms of life in a relation that is not detrimental to either; though he also recognizes that the term in biology is generally applied to different forms of life that are inexorably associated for mutual benefit. The association that he has in mind appears therefore to come rather within the term "commensalism" as used by zoologists. But apart from all definitions the subject is one of extraordinary interest.

A. Alcock.

LIPPINCOTT (Leon S.). **Blood Counts in Mississippi.**—*Jl. Lab. & Clin. Med.* 1926. Mar. Vol. 11. No. 6. pp. 524–527. [9 refs.]

These studies (3,045 counts) of blood in Mississippi were part of the routine of the hospital laboratory; but children's counts and counts with high eosinophile percentage indicative of animal parasites are not included in the conclusions, the chief of which are as follows: That the normal total leucocyte average for the locality is between 7,000 and 8,000; that there is not any marked difference in total leucocyte counts of whites and negroes, nor—except that basophile percentage is lower in negroes—in differential leucocyte counts; that the small mononulear percentage is normally higher than the usually accepted maximum; that the polymorphonuclear neutrophile percentage is near the usually accepted minimum; that the normal eosinophile count is less than 1 per cent.; that the normal basophile count is less than the usual standard of 0·5 per cent., and is specially low in negroes; that in total counts below 5,000 the mononuclear percentages are increased at the expense of the neutrophiles, and that in total counts above 10,000 the polymorphonuclear neutrophiles are in general below text-book expectations.

A. A.

NIGERIA. **Scientific Papers.**—*Ann. Med. & San. Rep. Nigeria 1924.* Appendix IV. pp. 63–72.

Under this heading are some observations of general interest. We learn that one of the chief problems which confront the surgeons in West Africa is the operative treatment of the enormous (usually sliding) hernias that are so commonly met with. The methods are discussed; in any event truss wearing is necessary for the rest of life. The spleen was excised in a male African aged 25, who was anaemic, complained of an aching pain, and whose temperature ranged between 99 and 100° daily. The spleen, which projected two inches below the costal margin, was probably of malarial origin. Blood counts were made twice but there is no mention of a search for parasites. The excision was done after a course of quinine and syphilitic treatment, and resulted in abolition of pain and fever and cure of the anaemia 12 weeks later. A general description is given of cases of cirrhosis of the liver with enormous ascites in patients about 30. In most instances alcohol is not a cause and the writer suspects syphilis.

A case of abscess of the spleen at Port Harcourt, reported by Dr. H. R. M. FERGUSON, proved to be due to *E. histolytica* which abounded in the pus. Dr. FERGUSON describes nine cases of appendicitis seen in 1924 but gives no indication of the race of the subjects.

A case of trypanosomiasis in a fox terrier, treated by Dr. GRIEVE, went from bad to worse till one-eighth of a grain of tartar emetic was given in the muscles and afterwards one-sixth every few days; trypanosomes had not been seen again six months later.

Of 132 cases of tetanus treated at the Colonial Hospital, Lagos, between April and December, 1924, and reported by Dr. W. R. PARKINSON, 54 died, a death rate of 40·9 per cent., which compares very favourably with the average rate in tetanus. In 9–10 of these cases, infection probably entered through small wounds of the feet, usually chigger wounds. These cases are milder than ordinary traumatic cases, and the writer thinks that the chigger patients become to some extent immune by getting frequent small doses of bacilli. In treatment he uses 1,500 units of anti-tetanus serum, as compared with the much larger dose recommended by the British War Office Tetanus Committee; intrathecal treatment was tried without success. The author strongly advocates magnesium sulphate in 20 per cent. solution, 5 cc. intramuscularly once or twice daily according to the frequency of the spasms, and believes it to be of enormous value.

A. G. B.

HOMMA (Hans). **On Apocrine Sweatglands in White and Negro Men and Women.**—*Bull. Johns Hopkins Hospital.* 1926. May. Vol. 38. No. 5. pp. 365–371. [5 refs.]

There are two types of sweat-glands, the exocrine or " e " and the apocrine or " a " type which may be traced through the range of mammals up to man. (SCHIEFFERDECKER, 1922).

> " The exocrine glands produce a fluid which is formed as little droplets within the protoplasm of the epithelial cells of the sweat-gland and then is pushed out into the lumen of the gland without any loss of protoplasmic substance. With the apocrine type, however, a part of the secreting cell itself is lost during secretion.
>
> " The exocrine glands start from the free surface of the skin, while the apocrine glands take origin from a hairfollicle. After the formation of the gland, it may happen that the aperture of the duct wanders from the hairfollicle to the free surface. On the other hand, the aperture belonging to an exocrine gland never wanders into a hairfollicle.
>
> " On account of this characteristic in the origin of the glands, it is plain that apocrine glands can be found only where hairs occur at some time of life. The palms and soles are free from them."

The apocrine glands occur in man only in certain places, such as in the axilla, external ear duct, and more sparsely around the nipple and anus. The author has examined skin from 12 white and 13 coloured men and women in the post-mortem room at the Johns Hopkins Hospital, avoiding mixtures of races. He tabulates his results and gives the following summary:—

> " The assumption of Schiefferdecker that a-glands were more frequent in negroes than in white people has been proved for the four regions examined; a-glands have been found in the skin of coloured three times as often as in that of white people.
>
> " We never found a-glands in the skin from the breast of white men; occasionally they occur in the skin from the breast of negroes.

**"The largest amount of a-glands in the examined regions was found in the skin of the mons veneris; then comes the skin around the anus, then that of the abdomen, and last, that of the breast.**

**"There is no difference between the frequency of iron in the a-glands of white and coloured people; nor is there any difference between men and women in this respect. In about 70 per cent. of the specimens showing a-glands, iron is found in their epithelium. This finding is characteristic for all the apocrine sweat-glands of the human body and not only for those of the axilla, as assumed in my former article."**

A. G. B.

## REVIEWS AND NOTICES.

RIGOLLET, MOTAIS, DUMAS (Raoul), LE DENTU (René), LASNET & CAMAIL. Maladies chirurgicales et oculaires aux colonies. Service de santé des expéditions coloniales. [**Surgical and Ocular Diseases of the Colonies. Health Service of Colonial Expeditions.**]—*Grall & Clarac: Traité Pratique de Pathologie Exotique Clinique et Thérapeutique.* Fasc. VIII. 638 pp. With 147 text figs. 1922. Paris: Librairie J. B. Baillière et Fils. 19 rue Hautefeuille. [8*s.* 6*d.*]

This, the eighth volume of a 9-volume treaty on Tropical Diseases, deals with surgical conditions, eye diseases and medical services for Colonial military expeditions. The first 120 pages are devoted to general considerations of trauma, shock, haemorrhage, etc., tetanus and phagedena, together with methods of surgical intervention and anaesthesia. Succeeding chapters treat of rupture and abscess of the spleen, cancer in Europeans and natives in the colonies, umbilical hernia, keloid, porters' lipoma (chronic bursitis), le "Mangy" [a chronic swelling of the parotid glands observed in Madagascar and recognized by the reviewer in Central Africa], vesical calculus, goundou. There then follow 150 pages given up to a diversity of subjects associated with obstetrics, including infant feeding and puericulture with some statistics of uncertain value on presentation, birth-rate, frequency of premature birth and twins, maternal and infant mortality. Diseases of the eye are then covered in 140 pages followed by 50 pages on liver abscess, and lastly nearly 200 pages are allotted to the organization of medical services for expeditionary forces in the colonies.

Published in 1922 there is nothing of novelty in this volume, and the English reader will find little of value to himself. The surgical aspects of elephantiasis, hydatid disease and schistosomiasis find no place here, neither are tropical ulcer, madura foot, climatic bubo nor granuloma venereum dealt with; perhaps they are included in other volumes. Malaria is quoted as the most frequent cause of splenic abscess, and there is no reference to the series of cases in natives reported from Rhodesia.

H. S. Stannus.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 3.

## HELMINTHIASIS.

KHALIL (M.). **The Effect of the Period of Service upon Parasitic Infection amongst the Cairo City Police Force.**—*Jl. Helminthology.* 1926. Aug. Vol. 4. No. 3. pp. 115–122. With 3 graphs.

The Egyptian Police represent the healthiest section of the inhabitants and are drawn mostly from the poorest agricultural and artisan classes. On joining, the policeman is subject to two factors not found in his previous civil life; i.e., he is well dressed and shod, and is not subject to re-infection with helminths. Stools were examined by smear (for Bilharzia and other parasites) and by the flotation technique previously described by the author (for hookworm). Urine also was examined.

Of 5,366 urines examined, 21·5 per cent. showed *S. haematobium* and ·1 per cent. *S. mansoni*; while of 5,322 stools examined, ·1 per cent. showed *S. haematobium,* 1·5 per cent. *S. mansoni,* ·5 per cent. *H. nana,* 16·5 *Ancylostoma duodenale,* 5 per cent. *Ascaris,* 2·3 per cent. *Trichostrongylus,* and in smaller percentages, *T. saginata, Oxyuris,* Whipworm, and *Strongyloides.* 62·8 per cent. were negative. The highest infections were in those previously engaged in agriculture (41·2 per cent.) followed by village artisans (20 per cent.) and town artisans (18·5 per cent.). Grouped according to length of service, the infections fell from 79·4 per cent., for those of less than three months to 14·4 per cent. for those of over 20 years. *S. haematobium* for the same range dropped from 46 per cent. to 4·4 per cent. *S. mansoni* infections all came originally from Lower Egypt, a result in agreement with Khalil's previous reports, and the distribution of Planorbis. Clinically, this disease is much more serious than *S. haematobium* infection. Ancylostoma infection fell from 47·8 per cent. to 3·9 per cent. for the above periods.

T. W. M. Cameron.

EMILY. La parasitose intestinale chez les tirailleurs indigènes du corps d'armée colonial. [**Intestinal Parasites in Native Troops of the French Colonial Army.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. July-Aug.-Sept. Vol. 24. No. 3. pp. 370–383.

The parasites of the French colonial troops quartered in Strasburg have been found by Emily to be as follows:—

*Malagasy.*—Of 1,206 examined, hookworms were found in 44 per cent., Ascaris in 38 per cent., whipworms in 22 per cent., *S. mansoni* in 17·5 per cent., Taenia in 4 per cent., and Strongyloides in ·5 per cent.

*Senegalese.*—Of 875 examined, hookworms were present in 60 per cent., Ascaris in 5·7 per cent., whipworms in 2·4 per cent., Taenia in 5·5 per cent., *S. mansoni* in 3·5 per cent., and Strongyloides in ·2 per cent.

*Indo-chinese.*—Of 906 examined hookworms were found in 66 per cent., Ascaris in 41 per cent., whipworms in 52 per cent., Taenia in 1·1 per cent., and Strongyloides in 1 per cent.

He points out the military importance of these infections, and suggests suitable prophylactic and sanitary measures.

T. W. M. C.

KOBAYASHI (Harujiro). **Parasitic and Endemic Disease in Chosen.**—*Mitt. d. Med. Akad. zu Keijo.* 1926. Vol. 9. No. 3 & 4. 6 pp. With 2 charts.

Apart from paragonimiasis it would appear that clonorchiasis is one of the most important infections in Korea. The following regions are known to be endemic foci: (1) Riri, North Zenra-Do; (2) Kampei, South Zenra-Do; (3) Taikyu, North Keisho-Do; (4) Shinshu, South Keisho-Do; (5) Shin-ei and Kinkai, South Keisho-Do. The location of these centres is indicated on a line map and it is noticeable that the infection is absent from the northern half of the Peninsula.

Of the tapeworms, *Taenia saginata* is very common all over the Peninsula (but absent in the vicinity of the city of Keijo), while *T. solium* is rare. *Dibothriocephalus latus* is not rare on the east and south coasts. Its occurrence coincides with the distribution of *Oncorhynchus perrvi,* which is the only known intermediary in the Far East.

Hookworm is common in the south and diminishes gradually to the north. *Necator americanus* is less common than *Ancylostoma duodenale* and is absent in the north. *Ascaris lumbricoides* prevails everywhere. *Trichuris trichiura* is very common in the south, less so in the north. *Oxyuris vermicularis* is not rare. Filariasis and elephantiasis occur in the southern half, especially in Chusei-Do and Zenra-Do. Schistosomiasis and trichinosis are unknown in Korea. Some cases of *Heterophyes heterophyes* and *Metagonimus yokogawai* are known. *Trichostrongylus orientalis* is common in the southern part but absent from the northern. (The paper concludes with a citation of statistics from various Japanese authors).

R. T. Leiper.

NAUCK (Ernst G.) & SHAN YU. Zur Frage der Verbreitung von Wurmparasiten in Mittel-China. [**The Distribution of Helminths in Central China.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 503–510. [7 refs.]

The chief source of infection with helminths in Central China in human excrement and so ascaris and whipworm are common. Other parasites include hookworm, Strongyloides, Trichostrongylus, Oxyuris and *Filaria bancrofti.* Trichinella is apparently absent, although a single case has been reported from Peking. The flatworms include *Schistosoma japonicum* and *Clonorchis sinensis* (a frequent canine and feline, but rare human parasite). *Fasciola hepatica* occurs in sheep and buffaloes. *Sparganum mansoni, Taenia saginata* and *T. solium,* Hydatid and *Hymenolepis nana* are also found.

T. W. M. C.

YANO (S.), SHIMIZU (T.), SHIRAI (S.) & KANEKO (T.). Ueber die Verteilung der Parasiten in der Nähe von Mukden. [**Distribution of Parasites in the Mukden Region.**]—*Jl. Oriental Med.* 1925. Nov. Vol. 4. No. 1. German summary p. 9. [In Japanese.]

650 persons in Mukden examined in the summer of 1924 showed the following infections :—

| | |
|---|---|
| *Ascaris lumbricoides* ... ... | 429 (66 per cent.) |
| Trichocephalus ... ... | 162 (2·5 [? 25 ] per cent.) |
| Ankylostomes ... ... ... | 6 (0·9 per cent.) |

The eggs of *Taenia solium* occurred in two cases and in one instance each, eggs of *Dipylidium caninum*, Oxyuris, *Trichostrongylus orientalis*, and *Clonorchis sinensis* were noted.

R. T. L.

PAPANDREA (F.). Sulla frequenza dei parassiti intestinali nei bambini. [**The Incidence of Intestinal Parasites in Children.**]—*Pediatria.* 1926. Oct. 15. Vol. 34. No. 20. pp. 1125–1127. [9 refs.]

The author examined the faeces of 200 children at Messina for the presence of helminthic ova. He divides the children into three groups : those in their first childhood, of which there were 44 ; those in the second, 60 ; and those in the third, 94. [These terms are not defined. We are accustomed to speak of a second childhood, but not in reference to infants.]

Of the whole 200, 126, or 63 per cent., were found to be harbouring intestinal parasites.

Six of the first group were passing ova : three those of *Trichuris trichiura*, two *Ascaris lumbricoides*, one *Oxyuris vermicularis*. One of the six was breast-fed only ; the others had artificial feeding in addition.

Forty-one (68·3 per cent.) of the second group were positive : Ascaris alone was the most frequent, 20 per cent., Trichuris next, 18·3 per cent., Ascaris and Oxyuris together in 15 per cent.

In the third group there were 79 positive (84 per cent.). As in the second, Ascaris was commonest (34·1 per cent.), Trichuris next (22·3 per cent.), Ascaris and Oxyuris again being third on the list with 16 per cent. Infestation with all three was found in 5·3 per cent. *Taenia solium* was found in this group only, on two occasions.

H. Harold Scott.

REMLINGER (P.). Sur l'absence de la bilharziose et de la rareté de la filariose à Tanger. [**The Absence of Bilharziasis and Rarity of Filariasis at Tangier.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 487–497. [26 refs.]

Although bilharziasis is found in several spots in Morocco, Remlinger considers that it is absent from the Tangier area in spite of the presence of *Planorbis dafourii* and *Bullinis contortus.*

Filariasis is either absent from the same region or is so rare as to be exceptional, although elephantiasis and chyluria are not rare.

R. T. L.

PAVLOVSKY (E. N.). **On the Epidemiology of Helminthiasis.**—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. English summary p. 229. [In Russian pp. 125–132.]

This is a short résumé of the methods by which helminths enter the body of man. The writer divides them into three classes : Those entering actively (Schistosomes, Hookworms, and Strongyloides) ; those entering passively (the great majority) ; and those carried by transmitters (the Filaria worms, etc.). Prophylactic measures are suggested for each type of parasite.

T. W. M. C.

NEVEU-LEMAIRE (M.). Helminthiases pulmonaires et bronchites vermineuses. [**Helminthic Infections of the Lung and Verminous Bronchitis.**]—*Le Bull. Méd.* 1926. Jan. 27, 30. Vol. 40. No. 5. pp. 116–120.

This is a valuable résumé of the helminthic infections of the lung in man. The author deals with the biology, symptoms, diagnosis and treatment of Paragonimus, Hydatid, and other lesser parasites together with the forms of parasitic bronchitis caused by the migrating larvae of Ascaris and hookworms. The article is of too general a character to permit of adequate abstraction and should be consulted in the original.

T. W. M. C.

DAUBNEY (R.). **The Diagnosis of Intestinal Helminth Infestation.**—*Kenya Med. Jl.* 1926. Aug. Vol. 3. No. 5. pp. 122–131. [11 refs.]

This is a discussion of the laboratory methods of examining faeces for the presence of ova. The methods discussed are the smear, sedimentation, flotation and the Lane technique. The author considers that the last is the best of the centrifugal flotation methods and is one which has given in his hands consistent results, especially with light infections.

T. W. M. C.

BRAILSFORD (J. F.). **The X-Ray Diagnosis of Animal Parasites (Helminthes) in Man.**—*Proc. Roy. Soc. Med.* (Sect. of Electro-Therapeutics). 1926. Aug. Vol. 19. No. 10. pp. 41–52. With 9 text figs. [37 refs.]

This is a review of the helminthic parasites which can be diagnosed by the assistance of X-rays. The chief parasites discoverable in this way are hydatid cysts and cysticerci and the article is largely devoted to a consideration of the appearances presented by these parasites. Others which have been seen by means of X-rays are calcified Trichina, Paragonimus, Onchocerca, Ascaris and Bilharzia.

T. W. M. C.

HALL (Maurice C.). **Developments in Anthelmintic Medication.**—*Amer. Jl. Trop. Med.* 1926. July. Vol. 6. No. 4. pp. 247–260.

Hall divides anthelmintic medication into three periods—a stage of uncritical empiricism which lasted for centuries ; a stage of increasingly critical empiricism lasting for under half a century; and the present stage of critical experimental investigation. In the first stage, the worms mainly considered were the human Taenias and the drugs still in use are in the main derived from the old plant drugs of this epoch. This stage passed into the next stage with the growing interest created by the discovery of the hookworm and various investigations into the value of various drugs, including thymol, betanaphthol, and chenopodium, were attempted. The obvious need for critical tests and the development of the modern techniques for the examination of faeces ushered in the present stage. Hall points out that faecal examinations tell nothing of larval, immature, male or old female worms and that we are still without accurate means for determining the number of adults present in a patient from an examination of the stool. The need for exact knowledge is emphasized, and this can only be obtained by experimental methods. These methods were inaugurated forty years ago by GRASSI & CALANDRUCCIO and by PERRONCITO when they established a satisfactory treatment for liver fluke in sheep by means of male fern. This method was later developed by RANSOM and Hall and has resulted not only in dependable treatment for most of the helminthic conditions of man and the domestic animals, but in the extended use of carbon tetrachloride for hookworm disease and the introduction of the new tetrachlorethylene. Hall points out that parasitology has been very largely neglected in American medical schools and pleads for a more thorough study of the subject in the ordinary medical course.

T. W. M. C.

HALL (Maurice C.). **Some Practical Principles of Anthelmintic Medication.**—*Jl. Parasit.* 1926. Sept. Vol. 13. No. 1. pp. 16–24.

The essential factors in anthelmintic medication are, according to Dr. Hall, practitioner, patient, parasite, parasiticide, purgative, and prophylaxis.

The *Practitioner* is the key factor to all the others, with which he must be acquainted. Hall claims that the American practitioner (human or veterinary) is handicapped by a lack of suitable training. In deciding the drug and the dose to be administered, the practitioner must consider the *Patient*, his age, size, sex, food, habits and general condition. In general, human patients, dogs and cats can be given a light evening meal and treated three of four hours before the morning meal, nothing being gained by a longer fast. Pigs require at least 24 hours fasting, while ruminants need only be fasted overnight. Horses, on the other hand, require 36 hours for parasites in the large intestine, and 12–24 for parasites in the more anterior parts of the alimentary canal. The nature of the food is important. Alcohol in general is inadvisable and alcoholism is a special contraindication for carbon tetrachloride. Carbohydrates are advisable with drugs of this type. Fats are contraindicated (except castor oil with chenopodium) and some, such as olive oil with chenopodium, are actually dangerous as they tend to remain in the stomach and favour absorption of the drug. A knowledge of the *Parasite*, its habits and habitat are, for obvious reasons, also necessary. The *Parasiticide* (poison) should be well understood and should not be used until the diagnosis is certain. Chenopodium is more effective against Ancylostoma and Ascaris while carbon tetrachloride is more effective against Necator and the ankylostomes and ascarids of the dog. Male fern destroys Fasciola but not Dicrocoelium. Tartar emetic or emetine will kill the blood flukes but not *Filaria bancrofti*. We are just entering on the stage in anthelmintic medication when data about the chemical composition and the anthelmintic value of drugs are becoming available. He considers that the now academic difference between vermicide and vermifuge should no longer be employed as it has no practical value. Contraindications depend on the patient and the drug used. General contraindications are extremes of age, febrile and debilitating conditions, gastro-enteritis, gross helminthiasis, high fatty diet, and such conditions as gastric stasis or pronounced constipation. Chenopodium is irritating, depressing and constipating; carbon tetrachloride tends to produce acute yellow necrosis of the liver; beta-naphthol destroys the red blood cells. In these cases the contraindications are obvious. Carbon tetrachloride is safe in pregnancy while the others, with thymol, are not; but it should not be used in gross ascariasis as it tends to cause a fatal intestinal obstruction with atony of the intestine; in ascariasis accompanied by gastro-enteritis, santonin should be used. In addition to the parasiticide, the practitioner must consider the *Purgative* (prompt purgation is protective). Many combinations are found to be effective in general practice, e.g., chenopodium and castor oil, carbon tetrachloride and epsom salts, santonin and calomel, and so on. Dogs will survive lethal doses of male fern or chenopodium if given with castor oil. Large doses of the purge should always be given and early purgation is essential, within 24 hours. All worms, of course, are not necessarily passed in this time and they may continue to be passed for a week or so. The final factor, *Prophylaxis*, depends on a knowledge of the life-history—ascariasis involves " coprophagy " and a lack of sanitation; hookworm infestation means skin infection which means skin exposure with concomitant lack of sanitation; trichinosis implies eating of improperly treated pork; filariasis indicates attack by mosquitoes and so on.

[This article is not a long one, but it merits the serious consideration of all practitioners who may have to deal with helminth parasites.]

T. W. M. C.

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HALL (Maurice C.) & SHILLINGER (Jacob E.). Eine neue Methode zur Untersuchung der Wirkung der Antihelminthika mit besonderer Berücksichtigung des Merkurochrome. **[A New Method of testing the Action of Anthelmintics, with Special Reference to Mercurochrome.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 391–396.

During the past ten years, Hall and Shillinger have tested anthelmintics by administering them to an animal, collecting, counting and identifying the worms passed. The animal is then destroyed and the number remaining is ascertained. Following this method mercurochrome 220, in 1·5 gm. capsules, was administered to dogs (up to 40 capsules being given to a single dog). The drug has an average of 88 per cent. efficiency for whipworms, but in some animals it removed 100 per cent. It is only slightly effective for ascaris and tapeworms, and not at all for hookworms.

T. W. M. C.

HALL (Maurice C.) & SHILLINGER (Jacob E.). **Gastro-Intestinal Lavage with Water at Comparatively High Temperatures for removing Worms from Dogs.**—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 341–346. [4 refs.]

Hall and WIGDOR in 1918 showed that water at body temperatures is quite ineffective in removing intestinal worms from dogs. Experiments with water at 47°–48° C., administered in amounts of 4, 3, 2½, and 2 gallons, removed 97·7 per cent. of ascaris, 77 per cent. of hookworms and 51·6 per cent. of tapeworms but resulted in the deaths of about half the animals used. They suggest that possibly water at 45° C. in quantities not exceeding 2 gallons might be of value in dogs.

T. W. M. C.

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HEYDON (G. M.). **Notes on the Treatment of the Intestinal Parasitic Worms which may be met with in Australia.**—*Med. Jl. Australia.* 1926. July 10. 13th Year. Vol. 2. No. 2. pp. 39–44.

The result is recorded of the treatment of the various helminthic conditions met with in Australia. Both species of hookworms occur but Necator is the commoner and much less harmful than Ancylostoma. The dosage, use and toxicology of oil of chenopodium, carbon tetrachloride and a mixture of these drugs is discussed. It is considered that carbon tetrachloride is the most effective against Necator; chenopodium comes next for hookworms in general and is useful against Ascaris; while the mixture is the best medication yet discovered for a mixed infection. Ascaris is best treated with santonin, although oil of chenopodium (or ascaridol) is also very good. Oxyuris, Trichuris, Hymenolepis, Taenia and their appropriate treatment are also discussed.

R. T. L.

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KUDICKE (Robert) & WEISE (Wilhelm). Untersuchungen ueber die wurmtötenden Eigenschaften von Halogenverbindungen des Mathans, Athans und Äthylens. [**The Vermicidal Properties of Halogen Compounds of Methane, Ethane and Ethylene.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. June 1. Vol. 30. No. 6. pp. 231–239. [12 refs.]

Strongyloides larvae were only killed by the gases of tribromethane, tetrachlorethane, dibromethane and also by tetrachlorehylene in strong concentrations, though all the substances with the exception of ethylbromide were proved active.

The action of the aqueous solutions was found to be inversely proportional to the solubilities of the substances. The strongest were tribromethane, tetrachlorethane and tetrachlorethylene. As a whole the bromine compounds were found stronger in action than chlorine compounds.

R. T. L.

DA COSTA (S. F. Gomes). Action des camphres sur les helminthes. **[Action of Cam ylate on Helminthes.]**—*C.R.* 95. No. 34. pp. 1273–1277. With 3 text figs. [7 refs.]

——. Action de l'hexétone sur les helminthes.—*Ibid.* pp. 1277–1279. With 2 text figs. [11 refs.]

——. Action du salicylate de sodium sur les helminthes et le coeur isolé.—*Ibid.* pp. 1280–1283. With 3 text figs [2 refs.]

Da Costa has studied the action on Ascaris of the camphors, a group the anthelmintic values of which have been little investigated. Of the three isomers of camphor, the right is least, and the left most active. His *in vitro* experiments indicate that " left " camphor ought to be studied as an anthelmintic. Hexatone has a considerable anthelminthic action.

T. W. M. C.

SHIRAI (Mitsuji). **On the Intermediate Host of** *Fasciola hepatica* **in Japan.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1925. Vol. 4. pp. 441–446.

The liver-fluke, *Fasciola hepatica,* is a common bovine parasite in Japan. Shirai finds that the intermediate host there is *Lymnaea pervia.* Miracidia were obtained from eggs in the gall bladder of cattle. They also penetrate *L. auricularia,* but do not develop in that host. Cercaria emerge about a month after infection. Experimental infections with rabbits and guineapigs showed that the young flukes penetrated the gut wall into the peritoneal cavity in order to reach the liver. Numerous haemorrhagic patches could be afterwards found on the intestine.

T. W. M. C.

BARLOW (Claude Heman). **The Life Cycle of the Human Intestinal Fluke** *Fasciolopsis Buski* **(Lankester).**—*Amer. Jl. Hyg.* Monographic Series No. 4. 1925. July. 98 pp. With 1 map, 12 text figs, 5 charts & 10 plates.

In the Shaohsing region of the Chekiang Province of China Fasciolopsis is more severe and occasions greater economic loss than hookworm and schistosomiasis together. In some villages 100 per cent. of the inhabitants are infested. The author estimates that the lives of as many as 1,500,000 people are profoundly affected. The wealth of material available at Shaohsing indicates that the various species listed by BROWN (1917) are unwarranted and are due to differences of treatment and preservation. NAKAGAWA (1920) first worked out the life history of the parasite in Formosa where it prevails much more in pigs than in man. In Shaohsing the author failed to find the parasite in native pigs and there is a local saying " where man has fluke disease, pigs do not; where pigs have fluke disease man does not." In 1923 the author gave a preliminary report of his observations and these are elaborated in the present monograph with an added wealth of observations and illustrations.

Extending over nearly a hundred pages of text with twelve text figures and 10 plates the present monograph will undoubtedly rank as a classic on this infestation. The author's summary gives but a slight indication of the numerous and new important observations in the paper. It [illegible] is the following of [illegible] readily killed by drying, and by lime in weak [illegible] ment within the egg to the miracidium [illegible] The optimum temperature for incubation is 80° to 90° F. The miracidium has two pigmented eyespots and two flame cells. The head is spined and the author describes a mouth which is probably patent. The free-swimming miracidium lives only 6 to 9 hours in warm weather, but may live as long as 52 hours in cool weather, although by that time it has lost power of penetrating its snail intermediary. The miracidium is killed by lime 1 in 10,000 and by copper sulphate 1 in 1,000,000. The intermediaries at Shaohsing are *Planorbis schmackeri* and *Segmentina nitidella*. Dead snails are not penetrated by the miracidia. Some development was obtained by keeping miracidia and sporocysts in filtered snail serum in micro-culture slides. Rediae form in sporocysts within 3 or 4 days and emerge in 9 to 10 days. The mother rediae were obtained as early as 8 days and as late as 254 days after experimental infection. The mother rediae never produce cercariae. Daughter rediae appeared as early as 13 days from infection. As many as 45 cercariae have been counted in a daughter redia. The cercaria is single tailed and is spined. The free swimming stage is brief. Encystment occupies from 1 to 3 hours. The inner wall of the cyst resists hydrochloric acid but is dissolved by intestinal juices. Forty-nine days elapse from date of infection of the snail to the encystment.

The encystment takes place on water-grown plants, especially the water-caltrop and the *Eleocharis tuberosus* which are fertilized with night soil and raised in shallow water ponds in which fresh water snails congregate. Drying the plant kills the cyst. On an average about 17 cysts have been found on the " nut " of the caltrop, but as many as 200 have been counted on a single nut. Pigs were successfully infected, although natural infection has not been recorded locally. The parasites so obtained were smaller than those raised in a human case.

R. T. L.

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KOBAYASHI (Harujiro). **Lung-Fluke Disease in Chosen.**—*Mitt. d. Med. Akad. zu Keijo.* 1926. Vol. 9. No. 3 & 4. 3 pp. With 1 map.

Kobayashi regards paragonimiasis as the most important parasitic disease in Korea. In 1923–4 the Government conducted a survey in those regions in which the infection was known to be most prevalent and found that 7·9 per cent. of the 353,729 Koreans and 0·7 per cent. of the 1,816 Japanese recorded in the survey were infected. The whole of the North Kankyo-Do and the northern half of South Kankyo-Do appear to be free. The molluscan intermediary belongs to the genus *Melania*. The species of Melania known to occur in Korea total about a dozen. The second intermediary in Korea is either the freshwater crab *Eriocheir sinensis* or the crayfish *Cambaroides similis*. The distribution of lung fluke disease in Korea is plotted on a text map in the article. The Koreans are very fond of crabs which they often eat uncooked while they take the raw juice of crayfish as a medicine for fever or diarrhoea. Official steps are being taken to prevent infection, viz.: (*a*) Propaganda by pamphlets, posters and kinematograph; (*b*) Legal prohibition of fishing for crabs and crayfish. Official treatment consists in emetine injections. Many patients recover and this treatment is considered to be a very satisfactory one.

R. T. L.

KOBAYASHI (Harujiro). **On the Final and Intermediate Hosts of Lung-Fluke in Chosen.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 413–417. With 3 charts.

Kobayashi records *Paragonimus westermanii* from the following wild mammals in Korea: Tiger, panther (very common), fox, wolf, and wild cat. There are ten species of *Melania* in Korea. Of these, five (*M. libertina, M. paucicincta, M. extensa, M. gotschei,* and *M. nodiperda*) have been previously proved to be intermediate hosts; the remainder he assumes to be intermediate hosts as they are the only species of this genus found in endemic areas (*M. libertina* var. *hidachiensis, M. multicincta* and three unknown species). The genus is absent from the northern part of Korea, possibly on account of the low winter temperature. As the second hosts are found throughout the province, the distribution of Melania determines the distribution of the fluke. The second intermediate hosts are *Eriocheir sinensis* (which is found throughout Korea) and two species of crayfish, *Cambaroides similis* (which occurs throughout except in the north) and *Cambaroides* sp. (which replaces the other in the north). *Sesarma dehaani* has been found in Korea; although it is a known host in Japan, no larvae have been found in this crab in Korea.

T. W. M. C.

ANDO (Akira). **Supplement to the Studies on the Development of Lung-Fluke.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress Tokyo, 1925.* Vol. 1. p. 419.

This very brief abstract gives no information beyond the fact that there appears to be a very close relationship between the lung fluke and the presence of oxygen.

T. W. M. C.

FAUST (Ernest Carroll). **The Epidemiology of Clonorchis Infection in China.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 397–403. With 1 map in text. [19 refs.]

*Clonorchis sinensis* does not occur endemically in man in Northern China, although dogs and cats are naturally infected. In central China, it is occasionally found in man; dogs and cats, however, are heavily infected. The fluke is common in human beings in south China, especially in the Canton and Swatow areas; the infection of the reservoir hosts in this area is light. In the Canton district, hospital examinations show a 25 per cent. infection, but in some areas it may rise to 100 per cent. In the Swatow district also, infection is very heavy.

*Bythinia striatula* is found throughout China, its frequence corresponding with the frequence of the fluke. It is, however, absent from north-western China. Faust's studies show that not only were all examples of the Cyprinidae examined infected, but that species of the Gobiidae and of the Anabantidae may also harbour the metacercaria. The principal hosts in north and central China (as in Japan and Korea) are *Pseudogobio altivelis*, *Hemiculter kneri*, and *Pseudorasbora parva*—all small species. In south China, the principal carriers are larger species—*Ctenopharyngodon idellus*, *Parambristis* sp., and *Labeo jordani*. Raw fish is only consumed among the Cantonese and Swatowese, and most infections are from eating raw fish; the remainder, however, come from eating fish insufficiently cooked (dipping for a few seconds in boiling water, etc.) or dried or salted fish. Elsewhere raw fish is not eaten: if it were, infection would be much higher. The disease could easily be eradicated within a generation by educating the population as to the dangers of eating raw or partly cooked fish.

T. W. M. C.

NAGANO (Kanji). **Studies on the Problems of** *Clonorchis sinensis*.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 379–385.

From the results of his experiments, Nagano concludes that the egg of Clonorchis does not normally hatch in the water but must be ingested by the snail before the miracidium can escape. The sporocyst is an irregular oval (·354 mm. by ·171 mm.). The redia is active and is able to migrate to the liver after escaping from the sporocysts. The cercaria has a pair of pigmented eye-spots, four ducts on the dorsal side of the oral sucker, and is rich in a yellow brown pigment; the digestive system on this account cannot be seen. At rest, the tail is held upwards. The free life of the cercaria does not exceed 50 hours. It creeps along under the skin of the fish, losing its tail as it does so, and is almost encysted within 5–6 hours. It is completely encysted within 24 hours. The oral sucker, eye spots, and excretory vesicle are still visible. After 8 days, the cyst commences to enlarge slightly, and by 52 days it has become oval in shape and the eye-spots have mostly disappeared, the pigment has become darker and is reduced in quantity, and the digestive system is now visible. Active metacercaria may be recovered from the water in which fish have decomposed, the majority being found within 2–4 days after death. The author considers that human infection is thus possible from drinking water. Bythinia is commonest on low-lying, stagnant ground. It can be destroyed in 24 hours with a ·2 per cent. mixture of " lime-nitrogen " which also destroys the 2nd intermediate host, but is not poisonous to mammals. Dredging and drying of canal mud are recommended as prophylactic factors.

T. W. M. C.

KHAW (O. K.). **Studies on the Egg-Miracidium Stage of the Life-History of** *Clonorchis sinensis* **(Cobbold) 1875.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 387–396. [13 refs.]

The egg of *Clonorchis sinensis* is fertilized in the " Oötype," and at the same time the shell is provided. Development continues as the egg passes down the coils of the uterus and by the time it has reached the bile it is mature. Khaw estimates that one adult (in the guineapig) deposits 1,600 eggs daily. The egg has a specific gravity of over

1·2, and there is a protective membrane protecting the miracidium which is more or less impermeable. The embryo will live, in its shell, for 3 months on ice (2°–4° C.), 6 months at 4°–8° C., 3–4 weeks at 26° C., 3 weeks at 37° C., and one hour at 50° C. It is immediately killed by drying, while in old night soil (at room temperature) it only survives for two days. It is destroyed in 5 days in 1 per cent. NaCN, and in 5 minutes in ·001 per cent. corrosive and ·025 per cent. of a concentrated solution of bleaching powder. Temperature appears to have little effect on the hatching of the embryo, although rapid changes in temperature, mechanical pressure, or changes in tonicity may cause the miracidium to emerge.

T. W. M. C.

ITO (Kuwataro). **[Biological Studies on the Cercaria of the** *Clonorchis sinensis.*]—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1926. Mar. Vol. 33. No. 2. [Summarized in *Japan Med. World.* 1926. Oct. 15. Vol. 6. No. 10. p. 289.]

The percentage infection of Bythinia varies according to the season. Temperature assists the freeing of the cercaria (optimum 27°–31° C.), low temperature inhibiting their liberation. Light and nature of water does not affect this. Cercariae swarm at the bottom of the water, moving briskly with a " jumping " movement. Their maximum free life is about 30 hours in water, 3 minutes in ·3 per cent. hydrochloric acid, and 3 hours in 1 per cent. sodium bichlorate. Normal serum and serum from infected animals have the same effect on the larvae which move briskly in 1 : 3 serum.

T. W. M. C.

FAUST (Ernest Carroll) & KE-FANG (Yao). **Specific Therapeusis in Clonorchis Infections.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 383–391. With 4 text figs. [7 refs.]

Faust and Ke-Fang used mercurochrome, gentian violet, tartar emetic, emetine and carbon tetrachloride in attempts to find a drug with a definite clonorchicidal value. The drugs were given orally or intravenously to experimental animals which were ultimately killed. The most potent in this series was gentian violet—orally, it destroyed 50–100 per cent., and intravenously 36–61 per cent. of the flukes. Tartar emetic intravenously destroyed 31–45 per cent. while the others had no effect. Mercurochrome and gentian violet both caused a marked reduction in egg production, which was preceded by hyperproduction ; the former drug has no effect on the flukes.

T. W. M. C.

KUWATARO. **[On the Distribution of the Worm in the Liver of the Rabbit suffering from Experimental Distomiasis.]**—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*) 1925. Nov. Vol. 32. No. 6. [Summarized in *Japan Med. World.* 1926. Apr. 15. Vol. 6. No. 4. p. 90.]

In 21 rabbits experimentally infected with *Clonorchis sinensis* the flukes were found to be situated peripherally in the liver immediately after death, but later they migrated to deeper portions.

T. W. M. C.

**Yamazaki** (S.). Beiträge zur Symptomatologie und Therapie der Distomiasis. [**Symptomatology and Treatment of Distome Infestation.**]—*Taiwan* [illegible] 1926. Feb. No. 251. German summary p. 4. [In Japanese.]

From a systematic faecal examination, 56 cases of distomiasis were diagnosed and the author finds that 20·3 per cent. showed enlargement of the liver, 10 per cent. anaemia, 10 per cent. diarrhoea, 6·8 per cent. oedema, 11·7 per cent. colic, 8·4 per cent. gastro-intestinal disturbances. and 8·4 per cent. asthenopia.

T. W. M. C.

**van Thiel** (P. H.). Beiträge zur Kenntnis der Trematoden aus *Anopheles maculipennis* Meig. [**The Trematodes from** *A. maculipennis*.]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Vol. 29. No. 1. pp. 396–400. [8 refs.]

Van Thiel gives grounds for believing that the encysted trematode larvae so commonly found in *Anopheles maculipennis* belong to the genus *Pneumonoeces*, several species of which live in the lungs of frogs.

R. T. L.

**Ozaki** (Yoshimasa) & **Asada** (Junichi). **A New Human Trematode,** *Heterophyes katsuradai* **n.sp.**—*Jl. Parasit.* 1926. June. Vol. 12. No. 4. pp. 216–218. With 1 plate. [6 refs.]

—— & ——. [**On a New Species of Katsurada's Heterophyes Family of Parasites found in a Human Case.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1925. Nov. No. 2445. [Summarized in *Japan Med. World.* 1926. Feb. 15. Vol. 6. No. 2. p. 42.]

**Asada** (Junichi). Eine neue Art Trematode des Menschen: "*Heterophyes katsuradai*."—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 360–365. With 4 text figs.

Under the name of *Heterophyes katsuradai*, Osaki and Asada describe what they believe to be a new species of intestinal fluke from human beings in Japan. They distinguish this form from the other members of the genus by the large size of the ventral sucker, and the distribution of the yolk glands which cross the dorsal median line to unite with each other at the anterior border of the testes. The flukes were recovered after treatment with thymol. The first intermediate host is unknown, but the second intermediary is the "Bora" (*Mugil cephalus*) and the parasite has been experimentally transmitted to the dog by feeding with the flesh of infected fish. It appears to be fairly widely distributed throughout Japan.

T. W. M. C.

**Ando** (Ryo) & **Tsuyuki** (Kae). [**On** *Echinostoma Gotoi* (**Ando-Ozaki's New Trematode) which has the Intermediate Host in Paludina.**]—*Iji Shimbun* (*Med. News*). 1926. June. No. 1190. [Summarized in *Japan Med. World.* 1926. Oct. 15. Vol. 6. No. 10. p. 285.]

The intermediate host of *E. gotoi* are two species of Vivipara. Feeding these snails to young rats produced the adults, and the authors suggest that, as these snails are eaten by the inhabitants, there may be a possibility of human infection.

T. W. M. C.

COLEMAN (Robert B.). **Egyptian Splenomegaly, and its Relation to Schistosomiasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. June 17. Vol. 20. No. 3. pp. 224–227. [8 refs.]

Coleman concludes that Egyptian splenomegaly is a special feature of *S. mansoni* infection, as had been previously stated by DAY (1924). The two diseases have the same limited geographical distribution. i.e., irrigation districts where end-canals are common. Microscopical examination of spleens in splenomegaly always shows the presence of the eggs of *S. mansoni*. He points out that cases of rectal schistosomiasis are by no means invariably caused by *S. mansoni* : cases from south of Cairo are always caused by *S. haematobium*. Antimony treatment is attended with good results in early cases, while splenectomy is certainly beneficial.

R. T. L.

KHALIL (M.). **The Bearing of Agricultural Schemes in the Nile Valley on Bilharziasis as observed at Kom Ombo Company Estate.**—*Jl. State Med.* 1926. Aug. Vol. 34. No. 8. pp. 472–477.

Khalil finds that Kom Ombo in Upper Egypt is a focus of *Schistosoma haematobium* infection. From a systematic examination of the urine, over 80 per cent. of the children were found to be infected, less in those born outside the village and in the better class of children, especially the girls. Infection is due mainly to the use of unfiltered and unstored water. *S. mansoni* is absent, but Ancylostoma, Ascaris and Hymenolepis are present. *Bullinus dybowski* and other species of the same genus were found, but Planorbis was absent. How the snails reached the village is unknown. Treatment will be undertaken, and methods of exterminating the snails are under consideration.

T. W. M. C.

CAWSTON (F. G.). **The Bilharzia Problem in South Africa.**—*Jl. Trop. Med. & Hyg.* 1926. June 15. Vol. 29. No. 12. pp. 177–179. With 4 text figs.

Cawston has found cercariae resembling those of Schistosoma in South Africa only twice in species of *Isidora,* other than *I. africana* : *I. tropica,* however, is heavily infected with amphistome cercariae. He points out that the mere presence of *I. africana* must be regarded as a risk of infection as they may be infected by carriers of Schistosoma. The solution of the problem of South Africa bilharziasis depends partly at least on education.

T. W. M. C.

CHANDLER (Asa C.). **A New Schistosome Infection of Man, with Notes on other Human Fluke Infections in India.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 179–183. With 3 figs. on 1 plate. [6 refs.]

In two apparently human stools collected in northern Bengal, from two villages where, however, pigs and goats were also common, Chandler has found eggs of an unknown trematode. To these he gives the name of *Schistosoma incognitum.* The egg is characterized by a slightly laterally directed spine and measures about 90–100$\mu$ by 45–50$\mu$, the spine being 8$\mu$ long. Chandler also records that *Fasciolopsis buski* is common in Bengal pigs slaughtered in Calcutta, and that it is frequently accompanied by *Gastrodiscoides hominis.* Of 26 stools examined from a village in eastern Bengal, three from children between 8 and 10 years old were found to contain eggs of *F. buski.* No case of infection of man with *G. hominis,* Opisthorchis, Clonorchis, or Heterophyes has yet come under the author's notice in the course of his work in India, although *O. felineus* is very common in cats in Calcutta.

R. T. L.

FAIRLEY (N. Hamilton) & MACKIE (F. P.). **A Preliminary Report on the Pathology of** *Schistosomum spindalis.*—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1, pp. 423–446. [15 refs.]

*Schistosoma spindalis* was found by MONTGOMERY in 1906 in *Bos indicus* and LISTON and SOPARKAR in 1918 discovered that its intermediate host is *Planorbis exustus* and goats were experimentally infected. In the present paper, Fairley and Mackie state that 4 per cent. of the goats in Bombay are naturally infected. Recently they have been able to infect the buffalo which they consider is the natural host. They were unsuccessful however in infecting *Macacus sinicus.*

The macroscopic appearances of a typical autopsy are the antemortem thrombosis in the portal or mesenteric veins and its branches, and changes in the liver varying from the early bilharzial pseudotubercles to a pipe-stem periportal cirrhosis. The microscopical changes are described in detail. This species is most closely related to *S. mansoni* and *S. japonicum* in habit, and so the liver is generally involved (whereas *S. haematobium* living in the pelvic plexus, which has a venous connection with the lungs, causes that organ to be frequently involved). In *S. mansoni,* verminous thrombosis is rare, while in *S. japonicum* and *S. spindalis* infections this is common. The spleen, unlike in the two human diseases, is seldom involved and bilharzial papillomatosis is not observed owing to the non-irritating character of the ova ; this explains also the absence of local necrosis and inflammation around the areas of egg deposition observed with *S. japonicum.*

T. W. M. C.

FAIRLEY (N. Hamilton). **The Serological Diagnosis of** *Schistosomum spindalis.* **(Cercarial Antigen.)**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 372–382. With 1 text fig. [7 refs.]

Infected livers of *Planorbis exustus* are teased with needles and 1 cc. of absolute alcohol added to each. They are shaken for 20 minutes and extracted for 24 hours at 37°C, filtered and concentrated in a water bath at 45° C., by bubbling air through until turbid. Alcohol is added until clear and the material is then put up in 1 cc. ampoules and stored in the ice chest until required. For routine work, it is used with the addition of 39 parts of saline. This cercarial extract is strongly antigenic and will detect human schistosomes, as well as *S. spindalis* and *S. indicum* in goats. By testing various alcoholic extracts of furcocercous cercaria against a known bilharzial serum, it is possible to state whether the cercaria is a schistosome or not. All his experimental goats developed a positive reaction within seven weeks of infection—the time of appearance depending on the heaviness of the infection—and the reaction persists as long as the animal harbours living schistosomes. Pleural and peritoneal transudates and exudates yield positive reactions, but not the cerebrospinal fluid. A pseudopositive reaction only occurred on one occasion, although all the animals had intestinal parasites and many had cysticerci. In this case a Fasciola infection might have been overlooked, and this is a possible fallacy. 24 out of 26 human *S. haematobium* infections reacted to the *spindalis* antigen ; but owing to the lipoid nature of the antigen, it is necessary to eliminate pseudopositive reactions in syphilitic sera. The antigen should only be prepared from heavily infected livers, the alcoholic extract should be evaporated and emulsified in saline ; and the serum should be examined within 24 hours.

R. T. L.

FAIRLEY (N. Hamilton). **Studies in the Chemotherapy and Immunity Reactions of Schistosomiasis.** (*Schistosoma spindalis* **and** *Schistosoma haematobium.*)—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 236–267. [87 refs.]

Working with *S. spindalis* of goats, Fairley finds that intravenous injections of alcohol-soluble extracts of the cercaria cause a marked increase in antibody content of the serum but do not modify the course of the disease. He also finds that the efficacy of tartar emetic and emetine is enhanced by the addition of small quantities of human serum. Tartar emetic cured 13 out of 22 animals when given on alternate days and 6 out of 7 when the injections were more frequent. He considers that 16–26 daily injections of 3·9 5·5 mgm. per kilo body weight will cure *S. spindalis* infection in goats. The drug is especially lethal to female worms and appears to have an inhibiting effect on egg production. Intravenous injections of emetine cured 8 out of 8 goats and subcutaneous injections 3 out of 4. It is as efficient but more toxic than tartar emetic. 45 animals were used in his experiments and all developed positive complement fixation reactions, but this disappeared in one to four months after treatment had commenced. He finds that in some clinically cured cases of *S. haematobium* infection positive reactions could be obtained a year later and suggests that this may be due to the survival of a limited number of males or too few females to produce symptoms.

R. T. L.

TURNER (A. W.). **Complement Fixation with Bilharzia : the Failure to produce Anaphylaxis with the Cercarial Extract used in the Test for Mammalian Bilharziosis.**—*Jl. Path. & Bact.* 1926. July. Vol. 29. No. 3. p. 307. [3 refs.]

Turner has tested the alcoholic extracts of cercaria used as antigen in the Bilharzia test and concludes that protein, if present at all, occurs in such minute quantities as to be undetectable ; i.e., to all intents and purposes there is no protein concerned in the Fairley reaction.

T. W. M. C.

CHENG FANG TSU. Ueber den acuten Milztumor bei *Schistosomiasis japonica.* **[The Acute Spleen Tumour in** *S. japonicum* **Infection.]**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 465–466.

In a rabbit of 2,400–2,850 gm. infected with 600–800 cercariae of *Schistosoma japonicum,* the spleen increases in weight from ·9–1·3 gm. to as much as 6 gm., and becomes dark red in colour. In acute schistosomiasis, at least when due to massive infection, a typical " spleen tumour " is formed, not through venous stenosis, but from an acute splenitis possibly from the excretion or secretion of the parasites in the portal system.

T. W. M. C.

REISINGER (E.). [I. Untersuchungen ueber Bau und Funktion des Excretionsapparats digenetischer Trematoden.] **[Structure and Function of the Excretory Apparatus of Digenetic Trematodes.]**—*Zool. Anz.* 1923. June 29. Vol. 57. Nos. 1–2. pp. 1–21. [Summarized in *Bull. Inst. Pasteur.* 1926. Apr. 15. Vol. 24. No. 7. p. 323.]

This is a histological and anatomical study of the miracidium of *Schistosoma haematobium,* special attention being paid to the excretory system.

T. W. M. C.

TOOTELL (G. T.). **The Comparative Treatment with Mercurochrome 220 Soluble and Tartar Emetic in Schistosomiasis Japonica.**—*China Med. Jl.* 1926. May. Vol. 40. No. 5. pp. 440–448. [1 ref.]

The clinical records are given of eight in-patients suffering from Schistosomiasis japonica who were treated with mercurochrome' 220 soluble. The dosage was computed on a basis of 2½ cc. of a one per cent. solution for every eleven pounds of body weight.

The author was led to try this drug, which has been used for malaria, in the hope that the duration of the treatment might be shortened and that the inoculations might be less painful. He concludes from his present experience that it is the drug of choice for patients in the early and uncomplicated stages of the disease and where the haemoglobin count is 70 per cent. or over. Where the disease is of long standing and the patient has low resistance it is better to give tartar emetic in increasing doses with iron and arsenic as tonics.

Although patients leave hospital cured, there is little hope that after they return to their homes they can avoid re-infection.

R. T. L.

FRANÇA (Carlos). Quelques considérations sur le traitement de la bilharziose par l'émétique. **[Treatment of Bilharziasis by Tartar Emetic.]**—*Revista Méd. de Angola.* (No. especial le Congresso de Med. Trop. da Africa Ocidental. Vol. 3, 3a, 4a e 5a Sessões.) 1923. Aug. No. 4. pp. 149–153.

França believes that undoubtedly the best treatment for bilharziasis is tartar emetic as used by CHRISTOPHERSON and he has studied the altered eggs in urine after the use of this drug. Such eggs may have a normal outline, but with a structureless embryo; or be very small (77–101μ), yellowish and granular; or shrivelled—which have developed completely but have been subsequently killed by the salt. He believes that the small granular eggs are immature and prematurely deposited and suggests that, after treatment, the measurement of the eggs passed is an index to the effectiveness of the drug.

R. T. L.

FRANÇA (Carlos). A ovometria nas schistosomoses. [**Measurement of Ova in Schistosomiasis.**]—8 pp. [3 refs.] [n.d., n.p.]

After treatment with tartar emetic, the bilharzia ova passed by the patient are smaller and granular. The author believes that the drug has procured abortion in the schistosomes and that these ova are passed before completing their development. Ovometry is therefore believed to be a useful indicator of the success of treatment of *S. haematobium*. In *S. mansoni* infection, however, the ova disappear suddenly, the females containing only one or two ova and in these infections disappearance is complete.

R. T. L.

GORDON (R. M.) **Emetine Periodide in the Treatment of** *S. haematobium* **Infections amongst West African Children.**—*Ann. Trop. Med. & Parasit.* 1926. Aug. 13. Vol. 20. No. 3. pp. 229–237. [8 refs.]

Antimony, although used since 1915 in the treatment of schistosomiasis, has always been employed as an injection, and in an attempt to find a preparation which, as suggested by LEIPER in 1925, could be given orally, Gordon has treated a series of cases with emetine periodide. Twenty-eight West African children suffering from severe *Schistosoma haematobium* infection were selected and divided into two groups of 14 each. One group received subcutaneous doses of emetine hydrochloride (½ grain daily for 15 days) while the other was given, by mouth, thrice daily for 15 days, one grain of powdered emetine periodide mixed with milk. No unpleasant effects followed this treatment. After 8 days, all the first group and twelve of the second group has ceased to pass live ova and the remaining two passed a mixture of dead and live eggs.

T. W. M. C.

TANABE (Bunshiro). **The Differentiation between the Seventeen Species of Schistosome and their Geographical Distribution in the World.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 449–463. With 1 map. [8 refs.]

This is a series of tables showing the differences between the 17 known members of the family Schistosomidae, including the 8 known species of Schistosoma.

T. W. M. C.

LEVY (David J.) & PIERSON (Merle). **Native Infestation by the Fish Tapeworm,** *Diphyllobothrium latum*. **Report of a Case in Detroit.**—*Jl. Amer. Med. Assoc.* 1926. Sept. 11. Vol. 87. No. 11. p. 848. [2 refs.]

Levy and Pierson report a case of an American born girl who has always lived at Detroit and who suffered from cramplike abdominal pains. She was found to be harbouring a specimen of *Diphyllobothrium latum*. On treatment with aspidium, the worm was passed and the pain disappeared.

R. T. L.

SCHMIDT (Harry B.). **A Simple Method for finding** *Dibothryocephalus latus* **Eggs in the Stools.**—*Jl. Lab. & Clin. Med.* 1926. June. Vol. 11. No. 9. p. 891.

The stool is mixed with a little saline, centrifuged and a drop of the sediment and the supernatant fluid examined on a slide, the coverslip being pressed down firmly to displace the operculum. It is often unnecessary to centrifuge the stool.

T. W. M. C.

ANDO (Akira). **Considerations relating to the History of the Development of** *Sparganum mansoni*, **especially of its** *Dibothriocephalus decipiens*.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 421–422.

Feeding experiments with *Sparganum mansoni* from man, cat, fowl and frog proved that these would develop into adult tapeworms in the dog and cat. The sparganum can be harboured by the monkey, pig, rabbit, guineapig, rat, mouse, hen, pigeon and frog, but not the carp. In some villages in Japan, as many as 95 per cent. of the cats and 20 per cent. of the dogs were infected with the adult.

[This paper appears to be only a short summary. The author refers to the adult tapeworm, resulting from feeding with *Sparganum mansoni*, as *Dibothriocephalus decipiens*, but no reasons are given as to why this is done.]

T. W. M. C.

BACIGALUPO (Juan). *Hymenolepis diminuta*: **su evolución.** [*Hymenolepis diminuta*: **its Evolution.**]—*Semana Méd.* 1926. Jan. 14. Vol. 33. No. 2. (1670). pp. 67–69. With 7 text figs.

*Hymenolepis diminuta* has been recorded by Professor GREENWAY from two children in Argentina, the first in 1904—a girl of 8 years arriving from Italy. After having been four months in the country, she had epileptiform fits. The second case was a boy of 18 months, an Argentine, who had not left his country, and arrived at some hospital in the province of Buenos Aires.

An examination of 300 rats showed that 28 per cent. of these were infected. The author studied the developmental stages of the parasite in *Tenebrio molitor* and illustrates them by 4 microphotographs.

R. T. L.

ROTH (E. J. H.). **Man as the Intermediate Host of the** *Taenia solium.*—*Brit. Med. Jl.* 1926. Sept. 11. pp. 470–471. With 1 plate.

Roth reports a case of a man who had suffered from "rheumatic" pains in the left knee joint for some five years and who had epileptiform "fits" at about monthly intervals for the past ten years. Some remarkable radiograms were obtained. These are reproduced and shew the presence of calcified cysts in various parts of the body. One cyst was removed under a local anaesthetic and proved to be *C. cellulosae.* The infection was probably contracted in India. There is no history of any intestinal tapeworm.

R. T. L.

DEW (Harold R.). **Observations on Hydatid Disease in the Domestic Herbivora** (*Echinococcus multilocularis*) **and its Relationship with** *Echinococcus alveolaris.*—*Med. Jl. Australia.* 1926. Sept. 4. 13th Year. Vol. 2. No. 10. pp. 301–309. With 8 figs. on 1 plate. [21 refs.]

Dew finds that about 40 per cent. of all sheep slaughtered at Melbourne harbour hydatid cysts, but in some regions the incidence is as high as 75 per cent. Cattle are much less frequently infested—the incidence being about 30 per cent. and the cysts are often sterile and degenerate. The sheep must be regarded as the most important intermediate host. The nomenclature of the various forms of hydatid cyst is very varied. Dew recognized the three following conditions:

(1) *Echinococcus polymorphus,* the unilocular or pouched form found typically in man.

(2) *Echinococcus multilocularis,* typical of the ox.

(3) *Echinococcus alveolaris,* a rare human form of limited distribution.

In sheep, the lungs and liver are most frequently infected (52 per cent. and 42 per cent. respectively) and the cysts are usually of a simple or pouched multilocular form, but occasionally a multicystic form similar to the bovine is seen. In cattle the lungs also are more frequently affected than the liver (69 per cent. and 27 per cent. respectively). Simple cysts are rare and the usual form seen is a typical multicystic variety consisting of congeries of small cysts separated from each other by fibrous adventitial septae, the cells of which are arranged in a peculiar trizonal arrangement. The cysts are invariably sterile.

Human alveolar hydatid is then considered (on the basis of DÉVÉ's work, as this variety is not found in Australia) and Dew considers that these three main types may be explained by considering them as interruptions at various stages of the parasite's life history.

(1) The embryo grows rapidly and actively and causes toxic changes in the surrounding tissue which are manifested by necrosis of the cells. If for some reason this is exaggerated, the result would be the production of a typical alveolar hydatid. The parasite would extend peripherally while centrally there would be cutical production owing to the action of the antibodies. Lack of food material in the centre of the parasite would ultimately cause the typical central necrosis.

(2) The second stage is the follicular stage in which the cellular reaction of the adventitial tissue assumes a trizonal form and the parasite elaborates its fluid and its cuticle. If this stage is reached

and persists, the picture is that of the bovine form. The persistent cellular reaction of the host seems to inhibit the ideal development of the parasite and so accounts for its sterility.

(3) If the parasite has settled in a fertile soil, the third or final stage is reached with the production of a more or less spherical fertile cyst and a perfect balance between parasite and host. If for some subsequent reason the vitality of the parasite is affected, it dies or produces endogenous daughter cysts.

T. W. M. C.

MÜNNICH (G.). Zur Kasuistik des chirurgischen Echinokokkus. **[Symptoms of Surgical Echinococcus.]**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 220–226.

Symptoms are generally lacking in early stages of hydatid disease —but damage of the cyst membrane causes eosinophilia and antibody production. Local symptoms followed by eosinophilia and a positive Weinberg test then make diagnosis fairly certain.

Successful use is being made of X-rays for localization of cysts in lung and liver cases and for the differential diagnosis of dermoid cyst and lung sarcoma and is also being tried as treatment for inoperable cases and before operation. DÉVÉ proposed sterilization of cyst contents before operation by injection of 1 per cent. formalin, and this lessens the danger of anaphylaxis. FUROCHETTO'S method of aspiration is largely used in South America. The sac could be totally removed or, where this was impossible, marsupialized, but many surgeons now used modifications of Posadas method (by which the sac was first closed without draining) in preference to marsupialization which is apt to have serious after effects.

In conclusion, two cases recently operated upon are described.

R. T. L.

DUHOT (E.), CRAMPON (P.) & LEFÈBVRE (J.). Sur la production d'anticorps spécifiques par injections expérimentales de liquide hydatique. **[Production of Specific Antibodies by Experimental Injection of Hydatid Fluid.]**—*Ann. Parasit. Humaine et Comparée.* 1926. July 1. Vol. 4. No. 3. pp. 232–235. [1 ref.]

The authors have injected filtered hydatid fluid into rabbits and find that specific antibodies are produced. Owing to the variations in the antigenic power of hydatid fluid in the Weinberg reaction, they suggest that an experimentally prepared antiserum would be of use in controlling the reaction in the diagnosis of the condition in man.

T. W. M. C.

CAMERON (G. R.). **A Note on the Enzymes of the Hydatid Cyst.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1926. Mar. 16. Vol. 3. Pt. 1. pp. 11–14. [6 refs.]

Cameron finds that the chief enzymes in the hydatid cyst wall are diastatic, but that there are present, in addition, a proteolytic enzyme coagulating milk, a trace of a lipase, a protease and oxidases. With the exception of the trace of lipase, there are no enzymes in the fluid.

T. W. M. C.

LEMAIRE (G.). Recherches sur la perméabilité des kystes hydatiques et sur la nature du poison hydatique. **[The Permeability of Hydatid Cysts and the Nature of the Hydatid Toxin.]**—*Presse Méd.* 1926. Sept. 18. Vol. 34. No. 75. pp. 1187–1188. [1 ref.]

In addition to an examination of the blood elements, the following tests are used in the diagnosis of hydatid. (1) Weinberg's reaction; (2) Gleig and Lisbonne's or the precipito-diagnostic reaction; and (3) the Casoni or intradermal reaction. Considering the first two together, it is found that they give a positive result in about 20 per cent. of cases. Even Lemaire's own results are 4 positives out of 24 verified cases. Casoni's reaction, on the other hand, gives much higher figures and he has obtained 21 positives out of 24 cases—16 having apparently sterile hydatids. He considers that these results do not agree with the theory of the impermeability of the cyst wall and that the high percentage of successful results in the Casoni reaction indicates that there is a filterable toxin with a special selectivity for the skin. The nature of this toxin is unknown. More constant results in diagnosis would be obtained by using a dialysed hydatid fluid, since where peptone bouillon is used as the vehicle for the toxin, non-hydatid cases sometimes react positively.

T. W. M. C.

LEMAIRE & THIODET. Sur la nature du poison hydatique. **[The Nature of Hydatid Toxin.]**—*C. R. Soc. Biol.* 1926. June 25. Vol. 95. No. 22. pp. 166–168.

The authors report 90 per cent. of successful results in the use of the Casoni reaction for hydatid. They draw attention to three cases in which, although hydatid was absent, a positive result was obtained—the patients suffered from cancer of the liver, amoebic abscess of the lung, and pleuro-pulmonary tuberculosis. In the two last a reaction similar to Casoni's was obtained by the use of peptone broth. Dialysed hydatid fluid, however, removes this source of error, and they suggest the routine use of such a liquid in practice.

T. W. M. C.

ANDERSON (C. C.). **X-Ray Diagnosis of Hydatid Infection.**—*New Zealand Med. Jl.* 1926. Aug. Vol. 25. No. 128. pp. 203–208. With 2 figs. [3 refs.]

Anderson considers that X-rays are useful in diagnosing hydatid infection in bones and ligaments and that the demonstration of circular, ovoid, or elliptical shadows in patients who have lived in sheep rearing countries or been in contact with domestic animals, especially dogs, is very suggestive of this disease. In other situations X-rays should be supplemented by other methods.

T. W. M. C.

STRACHAN (A. S.). *Cysticercus cellulosae* **of the Brain.** [Notes on Cases.]—*Med. Jl. S. Africa.* 1926. Aug. Vol. 22. No. 1. p. 13.

Dr. Strachan records a case of a male native (56 years old) who had suffered from delirium, whose meninges were studded with numerous

*Cysticercus cellulosae* and whose brain substance was also riddled with the cysts. No adults were found. He reports a second case of a native (60 years old) who had died of arteriosclerosis and who had a single Cysticercus embedded in the wall of the right ventricle of the heart.

R. T. L.

PRIEST (Robert). **A Case of Extensive Somatic Dissemination of** *Cysticercus cellulosae* **in Man.**—*Brit. Med. Jl.* 1926. Sept. 11. pp. 471–472. With 1 text fig.

Priest reports a case of *C. cellulosae* in a man, aged 24, The cysts were localized in various parts of the body and nearly all the muscles were enlarged. There was a history of abdominal pain, vomiting, and fever. Two excised cysts proved to be *C. cellulosae.*

R. T. L.

KLEIN (B.). Die Duodenalsonde in Verwendung bei Bandwurmabtreibungskuren. [**The Duodenal Sound in Tape Worm Treatment.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. June 1. Vol. 30. No. 6. pp. 250–251.

Klein has studied the value of treating tapeworm infections by means of Einhorn's duodenal sound. 65 cc. of a macerated preparation of Cort. granat. was introduced at body temperature to fasting patients three times at half-hourly intervals; and 80 cc. of Aqua laxativa Viennensis through the same sound half-an-hour later. An aperient was given. This method was successful in 17 out of 19 cases treated, twelve of which were *Taenia saginata,* four *T. solium,* and one *Hymenolepis nana.* Complete worms were expelled in 12 of the Taenia cases, and in 4 they were headless, but the heads were found in the faeces. The Hymenolepis worm was not found nor were eggs met with in the faeces during two years' observation. The sound could be used for other more resistant helminthic infections, and to reinforce therapeutic action.

R. T. L.

ISOBE (M.). **Physico-Chemical Conditions and Pharmacological Studies on the Movement of the Hexacanth Embryo.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. p. 1091.

[This article appears to be a summary.] Isobe believes that the only function of the hooks in the hexacanth larva of the cestodes is to enable it to escape from its shell. He states that quinine, chloral hydrate, alcohol, etc. "in a given concentration" have an inhibitory action on the movement of the larva.

T. W. M. C.

i. LLAMBIAS (J.). Altérations de la membrane hydatique. [**Changes in the Hydatid Membrane.**]—*C.R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. p. 1381.

ii. BRUMPT (Emile). Enkystement d'un anneau de *Dipylidium caninum* (L.) dans la paroi du gros intestin d'un jeune chat dysenterique. [**Encystment of Segment of** *D. caninum* **in the Wall of the Large Intestine of a Cat.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 365–368. With 2 text figs. [4 refs.]

iii. KOBORI (Kohtaro). [**Contribution to the Study of** *Hymenolepis diminuta*. **Communication II. Does this Parasite need Intermediate Host? On the Resistance of the Eggs.**]—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1925. Sept. Vol. 32. No. 5. [Summarized in *Japan Med. World.* 1926. Apr. 15. Vol. 6. No. 4. pp. 89–90.

i. Llambias records two cases of a peculiar abnormality in hydatid cysts which appears to be a hypertrophy with malformation limited exclusively to the cuticular layer.

ii. Brumpt records the finding of a segment of *D. caninum* encysted in the wall of the large intestine of a cat.

iii. Kobori finds that *H. diminuta* will not develop without an intermediate host, and that the egg is fairly resistant to chemical and physical changes.

T. W. M. C.

SANDGROUND (J. H.). **Some Observations on the Life-Cycle, Methods of Diagnosis and Incidence of** *Strongyloides stercoralis* **in the Tropics.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass. 1925.* pp. 240–245. [8 refs.]

——. **Some Biological Studies on the Life-Cycle in the Genus Strongyloides.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 528–533. [14 refs.]

LEICHTENSTERN had suggested that the two distinct types of life cycle observed in Strongyloides were due to the existence of two varieties, one prevalent in the tropics, showing the indirect cycle and the other found in temperate climates, showing the direct one. DARLING'S work, supplemented by the author's own, made this explanation doubtful, possibly because Leichtenstern had examined a limited range of cases and because of inadequate methods of examining cultures. Sandground examined 37 cases at Honduras—all of tropical origin—17 of which showed only the direct cycle (without free-living adults) the remainder showing both, but always with a marked preponderance of the direct. The indirect or heterotrophic cycle was never exhibited alone. He is unable to explain this phenonomon. Sandground considers that previously published figures for the incidence of Strongyloides are misleading as the other nematodes are usually diagnosed by some concentration method while Strongyloides larvae can only be adequately examined in smears, when light infections are easily overlooked. He therefore employs the method used by CORT, i.e., a mixture of faeces and charcoal is cultured on filter paper for a few days (30 hours is sufficient in the tropics) and then larvae are isolated by a modified Baermann technique. Of 105 stools examined by smear, brine flotation, and culture, Strongyloides was obtained 13, 0, and 37 times respectively, while hookworm, examined by the two latter methods, were found on 48 and 45 occasions respectively.

He concludes that Strongyloides infection is probably considerably more frequent than is revealed by ordinary diagnostic methods and is by no means so insignificant as is generally believed.

T. W. M. C.

SANDGROUND (J. H.). **The Rôle of** *Strongyloides stercoralis* **in the Causation of Diarrhea. Some Observations on the Condition of Dogs and Cats Experimentally Infected with this Parasite.**—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 421–432. [19 refs.]

Although Strongyloides is very common in tropical and some subtropical countries, its pathogenicity is still little understood. NORMAND'S belief that it caused Cochin China diarrhoea was not generally accepted since many organisms which are capable of causing diarrhoea were unknown to him. GRASSI, DARLING and others, however, believed that it was the cause of an irregular but chronic diarrhoea, and this view seems to be gaining ground, although the causal relationship with the condition has not yet been proved. Sandground points out that the parasite penetrates deeply into the mucosa or even submucosa, where it lays its eggs—often causing proliferation of the epithelium and infiltration of the intraglandular stroma. He has infected dogs and cats with *S. stercoralis* of human origin, and very typical pictures of acute diarrhoea were observed in most of the dogs and a few of the cats. In some cases the stools were dysenteric. He is yet unable to say whether the symptoms are caused by the mechanical irritation of the parasites or by a toxaemia.

T. W. M. C.

OUDENDAL (A. J. F.). Die Darmwand bei Anguilliasis intestinalis. [**The Intestinal Wall in Strongyloides Infection.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 510–520. With 9 text figs. [4 refs.]

Oudendal considers that the parasitic development of Strongyloides is as follows. The ovigerous specimens of Strongyloides penetrate into the Lieberkühn glands and, recurving their bodies in the fundus, lay one or more eggs which develop larvae. Each egg is surrounded by a more or less altered epithelial gland. The larva penetrates into the gland wall, and moults near by, leaving the old skin in the lumen of the gland. (The larvae swarm into the surrounding mucosa, near to, but not in, the muscularis mucosa ; they do not penetrate the blood vessels or lymph channels.) Finally it returns to the gut lumen, either directly or by perforating the duct of a gland. The epithelial cells may be destroyed by the violent motion of the larvae during ecdysis.

T. W. M. C.

MATSUMOTO (K.). **A Case of** *Strongyloides stercoralis.*—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. June. No. 255. English summary. p. 7 [In Japanese.]

The patient suffered from chronic diarrhoea and anaemia caused by Strongyloides and Ancylostoma—the latter was more easily expelled than the former, which alone remained after treatment. Some weeks later eosinophilia was still present in a high degree and the excretion of gastric juice had decreased.

R. T. L.

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ROSE (F. G.). **Studies in Filariasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. June 17. Vol. 20. No. 3. pp. 198–205. [3 refs.]

Rose has conducted a number of experiments with the larvae of *F. bancrofti*, and finds that the migration of the larvae to the cutaneous blood proceeds from about 6 p.m. till 6 a.m. Larvae in hypotonic saline are very much larger than those in hypertonic saline while similar differences are observed between larvae in the venous and cutaneous vessels, those from the cutaneous blood at night being much larger than those from the venous blood at the same time. Those in the venous blood at midday are much larger than those in the same situation at night, while if the periodicity is reversed the larvae in the cutaneous blood appear larger during the day than at night in the normal individual.

T. W. M. C.

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WAIL (S. S.), POPOW (P.) & PRJADKO (F.). Ueber die pathologisch-anatomischen Veränderungen bei Filariosis. [**On the Pathological Anatomical Changes in Filariasis.**]—*Virchows Arch. f. Path. Anat. u. Physiol.* 1926. Mar. 3. Vol. 259. No. 3. pp. 642–646. With 4 figs.

Microfilariae occur in every crow killed at the Moscow Tropical Institute. The adults, which in some cases could be identified as the species *Diplotriaena tricuspis* Fedtschenko, 1874, were found in the lungs, pericardium and occasionally in the muscles. Histological examination of the various organs of the crows revealed the microfilariae in the lungs and brain capillaries. In the lungs the microfilariae were present in large numbers both in the capillaries and in the lung tissue itself. Patches of haemorrhage were also noted here. The brains examined showed remarkable changes; the capillaries appeared distended with the parasites and very numerous degenerated ganglion cells with shadowy outlines were seen surrounded by rosettes of glia cells, some of which had penetrated into the ganglion cell itself. The plasma appeared pale, and the nuclei in a state of hyperchromatosis. Fragmentation of the Fibrillae was apparent. The whole presented a picture of neurophagia. The changes described were to be correlated with the mechanical interference with the circulation caused by the blockage of the brain capillaries with the parasites and also with the secretion of toxic substances by the microfilariae.

The authors hoped that their observations would show the importance of a more exhaustive study of the pathological anatomy of filariases in man and that such a study would throw light on the various clinical features of the disease.

R. T. L.

i. GUZMÁN (P. A.). La Filariosis en Venezuela. **[Filariasis in Venezuela.]**—*Gac. Med. de Caracas.* 1926. Jan. 31. Vol. 33. No. 2. pp. 27–30. [13 refs.]

ii. RIZAL (Leoncio Lopez) & PADUA (Regino G.). **Brief Report of Filaria Survey in the Philippines.**—*Jl. Philippine Islands Med. Assoc.* 1926. Sept. Vol. 6. No. 9. pp. 298–300.

iii. WU HSIANG FENG. **Note on the Movement of Microfilaria bancrofti.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 411–412.

i. Dr. Guzmân gives short notes of the clinical condition and blood examinations of eight cases of elephantiasis in Venezuela. One of these cases had also lymphatic abscess.

ii. An examination of 639 prisoners in 19 provinces of the Philippines showed that 21 harboured nocturnal and only one diurnal microfilaria in their blood.

iii. In urine, the movement of the larvae is "spring-like" but they slowly die in urine long voided.

T. W. M. C.

FÜLLEBORN (F.). Ueber den Infektionsweg bei Askaris. **[The Track of Infection with Ascaris.]**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 84–86.

While Ascaris larvae are able to pass through the capillaries of the general circulation, they become wedged in the finer capillaries of the lungs; but by breaking through into the alveoli, some of the larvae are able to bore back into the capillaries on the venous side and so are taken to the heart and distributed thence in the general circulation.

After being mechanically forwarded from the alveoli to the trachea by the action of the ciliated epithelium of the bronchioles they are taken into the intestine with the saliva where they become sexually mature. Development takes place especially in the smaller bronchioles which is possible (in spite of the ciliated epithelium) on account of their partial blockage resulting from the pneumonia set up by the boring of the worms.

The amount of tissue bleeding depends on the compactness or looseness of the tissue in which the vessel is imbedded. In the brain this bleeding is slight which makes intelligible the lack of cerebral symptoms in even heavy Ascaris infection. The extent of "vessel boring" in the different organs depends on the number of larvae in the arterial blood. Variations in this number in different arteries are to be connected with the presence of a marginal zone 0·2–0·3 mm. broad, which remains free of larvae, and it depends on the acute or more right-angled branching of the artery as to what quantity of the larvae-containing stream flows through.

R. T. L.

KOIDZUMI (M.), HIRAISHI (S.) & KOINO (H.). **Studies on Ascarides.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. p. 335.

Although morphologically indistinguishable, there is no evidence that the pig Ascaris can mature in man and vice versa; indeed Koino's experiments seem to prove the reverse, Hiraishi carried out feeding experiments on pigs for over four years and found that pigs fed on human ascaris and on porcine ascaris gave alike negative results; if, however, vitamin A was withheld from their diet, the animals were infected with both strains. Koidzumi and Koino found a cytological difference between the two forms: namely, the haploid number of chromosomes in the human ascaris appears to be 12, while in the pig form it is 13.

[This article appears to be a summary.]

T. W. M. C.

SHIMAMURA (Torai). **A Chemical and Pharmacological Study on the Toxic Principle of the Ascarid.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 337–339.

[This appears to be a summary.] In ascarids is a toxic substance (it is also found in many different species of nematodes) which when given intravenously to guineapigs and horses causes anaphylactoid shock reactions. The writer calls this Ascaron and it appears to consist mainly of albumoses and peptones. In its purified state 0·1 mgm. is lethal for a horse and 0·01 mgm. for a guineapig. In the latter animal the predominant symptom is bronchospasm; while in the horse there is sweating, hyperaemia of the visible mucous membranes, abundant nasal discharge and a colicky diarrhoea. On autopsy, the blood is incompletely coagulated and there is a haemorrhagic inflammation of the large intestine. The action of ascaron in the guineapig resembles that of histamine, but it differs from this drug in several respects. Horses may be rendered resistant to 300 times the lethal dose, but no antibodies can be demonstrated in the blood. The writer considers that the action of this toxic substance is not anaphylactic, but anaphylactoid.

T. W. M. C.

FISHER (C. F.) & BITTINGER (W. P.). [**Verminous Abscess.**]—*West Virginia Med. Jl.* Charleston. 1926. June. Vol. 22. p. 314. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Aug. 7. Vol. 87. No. 6. p. 442.]

In a boy of 16 an abscess about the size of a walnut was found on the ileum. It was located in and formed by the bowel wall and there was no opening between the pocket and the lumen of the intestine. There was a single *Ascaris lumbricoides* and about a dram of a yellowish-brown fluid in the abscess.

R. T. L.

i. MORINAKA (K.) & ISHIKAWA (S.). **The Treatment of Ascariasis by Injection of Santonin Preparation.**—*Jl. Oriental Med.* 1926. July. Vol. 5. No. 1. English summary pp. 1–4. [5 refs.] [In Japanese.]

ii. NANHORYA (H. B. D.). **A Case of Acute Intestinal Obstruction caused by** *Ascaris lumbricoides.*—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. pp. 396–397.

iii. OGATA (Seiji). [**Studies on the Prevention and Extermination of Ascaris.**]—*Jikwa Zasshi* (*Jl. Pediatrics*). 1925. Dec. No. 307. [Summarized in *Japan Med. World.* 1926. Apr. 15. Vol. 6. No. 4. p. 98.]

**i. Morinaka and Ishikawa have treated 40 cases suffering from Ascaris infection with subcutaneous, intramuscular or intravenous injections of "Santonin- sodium," all the worms being expelled in 35 of the cases.**

ii. Nanhorya reports acute intestinal obstruction, caused by a mass of 37 Ascaris in a native boy three years old; 43 worms were passed later and after a successful operation.

iii. The simplest method of destroying the eggs of Ascaris on vegetables is to boil them, salting being ineffective.

T. W. M. C.

SCHWARTZ (Benjamin). **Specific Identity of Whipworms from Swine.** —*Jl. Agric. Res.*. 1926. Aug. 15. Vol. 3. No. 4. pp. 311–316. With 2 figs. [10 refs.]

Schwartz has compared whipworms from man, chimpanzee, monkeys and pigs and is unable to find any features by which these forms may be differentiated. *T. trichiura* of man and *T. suis* of pigs are generally separated by means of the shape of the spicules and the spicular sheath, but the differences between these organs he finds to be merely such variations as may be found within a single species. He concludes that *T. suis* must be regarded as a synonym of *T. trichiura.*

T. W. M. C.

SCHWARTZ (Benjamin). **A Possible New Source of Infection of Man with Trichuris. With a Consideration of the Question of Physiological Varieties among Helminths.**—*Arch. f. Schiffs- u. Trop. Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 544–547. [8 refs.]

Schwartz draws attention to the fact that the whipworms of man and pig are indistinguishable morphologically and that, in the absence of biological evidence to the contrary, the pigs must be considered as reservoir hosts to man. He warns against placing too much reliance on morphological identity as a criterion of biological identity. He has unsuccessfully fed human ascaris eggs to pigs and porcine ascaris eggs to monkeys.

T. W. M. C.

MILLER (Newton). **Living Trichinella Thirteen Years Old.**—*California & Western Med.* 1926. Nov. Vol. 25. No. 5. pp. 633–634. With 1 text fig.

13 years ago, Mrs .E. L. ate some pork sausages and four days later suffered from abdominal pains and cramps with diarrhoea. Shortly after recovery she experienced a stiffness and intense generalized muscular pains similar to rheumatism, accompanied by anaemia, oedema and thirst. This eventually disappeared. During an abdominal operation in 1923, trichina cysts were found in a piece of excised muscle. Histologically these seemed to shew no signs of degeneration and the writer concludes that they were alive and assumes that they had resulted from the infection of 13 years previously. The patient is still alive.

R. T. L.

SAITO (Masao). **[Development of** *Hepaticola hepatica.* **A Supplementary Report.]**—*Taiwan Igakkwai Zasshi* (*Jl. Formosan Med. Soc.*). 1925. Oct. No. 247. [Summarized in *Japan Med. World.* 1926. June 15. Vol. 6. No. 6. pp. 153–154.]

Eggs of *Hepaticola hepatica* take three months at 16°–20° C. or one month at 33°–34° C. to develop. The larvae may reach the liver through the portal vein or through the abdominal cavity. They may be carried to abnormal situations (brain, kidney) by the circulation. Eggs are passed in 27 to 28 days after infection. The normal life cycle may be completed in the dog, but not in the rabbit.

T. W. M. C.

KOINO (Hisashi). **Studies on the Development and Structure of the Larvae of** *Trichostrongylus orientalis*, **and their Migratory Course in the Host.**—*Far Eastern Assoc. Trop. Med Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 467–470.

*Trichostrongylus orientalis* is not uncommon in Japan. The egg resembles that of the hookworm, but is much longer and is thickened towards the anterior pole and has a slight dorso-ventral asymmetry. At 26°–30° C the eggs hatch in 40–45 hours; the first moult occurs in 2–3 days, the second in 3–4 days. The infective larva normally remains in its sheath, but may exsheath after a month. The migrations and mode of infection seem to be similar to that of the hookworm. In mice infected by mouth, the larvae penetrated the stomach or duodenum and so reached the lungs, passed up the trachea and were swallowed a second time. The larvae may also penetrate the skin, following the same route, but skin infections are very light, and Koino considers that oral infection is the normal and the commoner mode. He states that the larvae may be distinguished from those of the hookworm and promises the details in a future paper.

T. W. M. C.

ESPIÉ (A.). Note préliminaire sur un nouveau parasite intestinal humain de la Tunisie (*Trichostrongylus* sp. ?). [**A New Human Intestinal Parasite in Tunisia.**]—*Arch. Inst. Pasteur de Tunis.* 1926. Sept. Vol. 15. No. 3. pp. 283–285.

Espié has found on five occasions in human stools, a few eggs resembling those of hookworms, but ovoid, elliptical or sometimes pyriform in shape, measuring 75 to 105 $\mu$ long by 40 to 50 $\mu$ broad, the average being 90 $\mu$ by 45 $\mu$. They occur in the morula stage. He believes that they belong to some species of Trichostrongylus—a genus of nematodes which has not hitherto been found in French northern Africa, but is not uncommon in Egypt.

T. W. M. C.

CHANDLER (Asa C.). **The Prevalence and Epidemiology of Hookworm and other Helminthic Infections in India. Part I. Introduction and Methods. Part II. Eastern Bengal.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 185–194. [14 refs.]; 195–218. With 1 map. [6 refs.]

Although hookworm infection and hookworm disease are known to be prevalent in India, there is little accurate information as to the incidence and local epidemiology. Chandler considers that jails and asylums, where most of the large series of examinations have been made, are not suitable for study when the intensity as well as the incidence is to be considered. About 100 samples of stools were collected in each selected locality and posted to Calcutta, where they were examined by Lane's D. C. F. technique for incidence and Stoll's method for degree of infection and Infection Index (see this *Bulletin*, Vol. 22, p. 888) calculated. Soil samples were also examined by a modified Baermann technique. Several local cities in eastern Bengal were surveyed and it was found that the amount of hookworm infection accurately reflected the different conditions with respect to defaecation habits. Where latrines were used as in the Jobarpur and Sodepur localities, the incidence was found to be between 60 and 65 per cent., the average e.p.g. were under 100 and the infection index was 60–65. On the fringe of the latrine belt, e.g., Sitakund locality, the figures are respectively over 90 per cent., 221, and 128: while outside the latrine belt (Dhala locality) the figures were over 98 per cent., 340, and 156. Ascaris and whipworms were common in all areas, suggesting that the water supply was not free from contamination. Chandler considers that hookworm disease in these districts can be easily controlled by the adequate use of latrines.

T. W. M. C.

CHANDLER (Asa C.). **The Prevalence and Epidemiology of Hookworm and other Helminthic Infections in India. Part III. Central, Western and Northern Bengal. Part IV. Assam and the Hill Areas of Eastern Bengal. Part V. Tea Estates of Assam and Bengal.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 451–480. With 1 map. [15 refs.]; 481–492. With 1 map. [1 ref.]; 493–504. [4 refs.]

Continuing his surveys of helminthic infections in India, Chandler has examined various areas in Bengal and Assam.

Part III. *Central, western, and northern Bengal.* In the villages of the plains the amount of hookworm is small, the general incidence being about 80 per cent., the e.p.g. about 200, and the index of infection 126. In the Sunderbands on the coast infection is negligible; but in Darjeeling the incidence rises to about 90 per cent., the average e.p.g. are 900, and the infection index is 267. Apart from the districts immediately inland from the Sunderbands, latrines or standing places are absent and pollution of the soil all round the villages is the rule. Beetles actively bury the faeces and domestic animals, especially pigs, dogs and cattle, devour the stools. Heavy clay and light sandy soils are unfavourable to hookworms; and the high rate in Darjeeling is due to favourable soil, abundant moisture, and moderate temperature. Chandler considers that the dry season of four to six months destroys many of the larvae, and as adults are quickly lost during this period and are not being replaced, fewer eggs are available at the beginning of the next wet season. To this he ascribes the lightness generally of hookworm infection. Ascaris and whipworm are common but irregularly distributed. Strongyloides was only common near Khulna and Jessor. Hymenolepis was rare except in parts of Asanol, where he found a 20 per cent. infection in one colliery lines. Taenia is very rare, except in Bhutan and Tibet, where the habits of the people make it a very common parasite. Fasciolopsis was only found on three occasions, although it is common in pigs. A local water bulb (*Trapa bicornis*), which is eaten by the natives, may carry the metacercaria. As prophylaxis, Chandler suggests the encouragement of the use of latrines or standing places of a type which does away with fouling and bad odour.

*Part IV. Assam and the Hill areas of eastern Bengal.* Here hookworm infection is much more severe. In the western part, the infection index was less than 100, but elsewhere it varied from 190 to over 300. Latrines are only found in Manipur (where the infection is light): elsewhere soil pollution is general. In these areas also conditions are favourable for heavy infestations. The dry season is shorter and the temperature lower than in Bengal. Ascaris and whipworm are common and, except in Manipur, 70 to 90 per cent. of the inhabitants are infected. Trichostrongylus was common in the Chakmas and Mughs on the Chittagong hills, but not elsewhere. *H. nana* was only found in 8 per cent. of the Manipuis, while *F. buski* was only common in the Manipur valley, although it occurs elsewhere. *G. hominis* is stated to be commonly found in the Pasteur Institute at Shillong. Four instances of what Chandler considers to be pseudoparasitism by a fluke of the genus, *Isoparorchis* (*I. trisimilitubis*?) have been reported from Manipur. This fluke appears to be common in the air bladders of a local fish ("Boal Fish") and it was asserted that infections with the fluke were associated with the eating of the fish.

*Part V. Tea Estates of Assam and Bengal.* Hookworm is higher here than in the rural populations elsewhere—the infection index ranging from over 400 (in Darjeeling and in the northern Dooars) to 248 (in Cachar). Soil pollution is universal and most of the human infection takes place from standing on old stool sites during defaecation. Ascaris and whipworm are common, while Trichostrongylus occurs in 10 per cent. of the coolies in Dooars and Himalayan gardens. As in the previous cases, the use of simple non-fouling latrines is advocated, which he believes would be readily used.

T. W. M. C.

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KORKE (Vishnu T.). **Observations on Ankylostomiasis in some Areas in British India.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 383–407. With 2 text figs. & 1 map. [11 refs.]

Korke finds that hookworm is prevalent (average of 43 per cent.) in the convict settlements in the Behar area—the common species being *A. duodenale. N. americanus* is rare. Ascaris and whipworm are also common, while Toxascaris, Strongyloides, Trichostrongylus, Oxyuris and *Taenia saginata* also occur. Microfilaria were found in 30 out of 107 night examinations, while 37 day examinations were negative.

T. W. M. C.

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BARNES (M. E.) & RUSSELL (Paul F.). **General Survey of Hookworm and Helminth Infections.**—*Malayan Med. Jl.* 1926. Sept. Vol. 1. No. 3. pp. 20–27. With 4 graphs.

Using a Willis-Molloy flotation technique, the Stoll egg count method, worm counts and haemoglobin readings, Barnes and Russell found 73 per cent. (out of 4,620) infected with hookworm in the Straits Settlements. The highest infection was among the Malays (79 per cent.) and the Indians (78 per cent.), but the other races (except the Europeans, with 35 per cent. infected) were only slightly less. The maximum severity was found in Malacca; the intensity is highest in agricultural workers and lowest in domestics. Ascaris and whipworm are also common.

T. W. M. C.

CORT (W. W.), GRANT (J. B.), STOLL (N. R.) & other collaborators. **Researches on Hookworm in China. Embodying the Results of the Work of the China Hookworm Commission, June, 1923 to November, 1924.**—*Amer. Jl. Hyg.* Monographic Series. No. 7. 1926. Oct. pp. ix + 398. With 7 plates, numerous text figs. & charts. [Numerous refs.]

The methods used in the gathering of information by Cort and his collaborators were similar to those used in their West Indian investigations, viz. the Baermann apparatus for isolating larvae and the Stoll dilution egg count method. In China, however, Ancylostoma as well as Necator is present (in about the proportion of 3:2), and it was found that the egg count per gram divided by 100 represented the approximate number of adult hookworms harboured—a much higher figure than in their previous studies—and they state that this factor must be obtained for each large area where it is being used. Much of the rest of the information was obtained by means of questionnaires sent out to medical missionaries. In addition to their studies of egg counts, soil pollution and infestation (as in the West Indies), it was necessary to investigate the use of human excrement as manure.

China may be roughly divided by a zone extending from the Yangtze to the north of Szechwan. North of this zone lies Northern China, with cold winters, low rainfall, millet and wheat cultivation, and the dry use of human fertilizer. Hookworm disease does not exist as a public health problem in this area, probably because of the climate. South of the zone lie Central and Southern China, where the temperature is higher, rice, cotton, mulberry, etc., are cultivated and the wet method of using human faeces is employed. Both hookworm infestation and disease are widely distributed and in certain areas are of considerable importance. In the Yangtze area, in Soochow, in Kwangtung, and in Wuchow it is one of the more important diseases. Hookworm disease is largely a rural problem (except in the few cases where vegetable cultivation is practised within the city walls) and is an occupational disease spread almost entirely by the use of night soil as fertilizer. Contrary to general belief, it was found that hookworm was not spread in rice cultivation, but that actually the use of night soil on the paddy fields was an important means of control. Cotton cultivation only causes a subclinical infestation. Vegetable culture is not an important source of infection either, under normal circumstances. Mulberry cultivation is *the* important source of the disease. The night soil is stored for a considerable period before use in May, when it is applied to the trees to prepare food for the heavy summer brood of silk worms. To ensure rapid penetration, the soil is broken up round the trees and the manure applied close to the trunk. Two to four weeks later the pickers enter the field (at the peak of the intensity of the soil infection) and stand close to the trunk to pick the leaves, wearing thin sandles and often standing in mud. The conditions for human infection are therefore ideal, and the severity of the disease is due to this few days contact each year with the infested mulberry trees during the second picking of the leaves.

Hookworm disease in China is therefore associated, not with general but with particular methods of fertilization employed with certain crops. Control is accordingly not a general sanitary problem, but centres round a purely economic factor.

Experiments showed that the danger did not come from infective larvae in night soil, but from viable eggs which develop after the manure is spread. Over 95 per cent. of the eggs are destroyed in one month in night soil stored at ordinary summer temperature, and after two months practically all are destroyed. Stirring the faeces seems to reduce this time by half. It was found that the addition of lime (preferably, but not necessarily, unslaked) to the night soil in the proportion up to 1 part to 500 parts of faeces, in 6–12 days prevents the development of the ova.

Cort suggests that organized hookworm campaigns could be profitably carried out in the mulberry regions in the Yangtze delta, Kwangtung, and Szechwan. Stoll estimates that 24 million tons of human faeces, with a value of about 900 to 3,000 million dollars Mex., are annually used in China. [In reading this chapter it is necessary to remember that *billion* has not the same meaning in Britain as in the United States.

Economically it is impossible to eliminate the use of night soil as manure, and control depends on modification rather than suppression. These methods must be cheap and alter as little as possible present practice. The use of other fertilizers could be urged; or adequate storage (no manure being used which has not been stored for at least a month), the addition of lime to the night soil, and personal prophylaxis (heavy shoes, etc.) are suggested as theoretical means of control; but it is recognized that the education of a conservative population (night soil was in use a thousand years before our era) with a high percentage of illiteracy, often in inaccessible regions, is a more complicated question than it seems at first sight. It is suggested that an adequate Chinese medical personnel would have a very great influence in assisting to control the disease.

T. W. M. C.

MANALANG (Cristobal). **Studies on Ankylostomiasis in the Philippines.** —*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 351–368. With 5 maps.

Although there is a fairly high hookworm incidence in the Philippines the disease is rare. Latrines are now being widely used and in some places householders without latrines are penalized. Carbon tetrachloride appears to have a definite ovicidal effect on Necator, which was not observed with oil of chenopodium or thymol.

Of five deaths associated with the hookworm campaign, three only could be even remotely ascribed to it; these three cases suffered respectively from gastric carcinoma, gastric ulcer, and duodenal ulcer.

The commenest species of hookworm in the Philippines is Necator, but in some spots *A. duodenale* is common. A few cases of *A. braziliense* were observed in man; it is very common in dogs and cats locally. The writer mentions two human infections with *A. caninum*, but it is not clear whether he is reporting these from his own observation or not.

T. W. M. C.

MANALANG (Cristobal). **Hookworm Infestation among Japanese Immigrants and Residents.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 369–377.

475 Japanese immigrants to Zamboanga (Philippines) were examined for helminths. 54 per cent. were found to be free from infection, 17 per cent. had Ascaris, 25 per cent. whipworms, 6·7 per cent. hookworms, and 3·5 per cent. Strongyloides. An examination of 41 Japanese labourers, who had been in Davao for some time, shewed that all were infected with hookworm.

T. W. M. C.

CARR (Henry P.). **Observations upon Hookworm Disease in Mexico.** —*Amer. Jl. Hyg.* 1926. July Supp. Vol. 6. pp. 421–461. With 4 text figs. [4 refs.]

The principal species of hookworm in Mexico is *Necator americanus*, but about 8 per cent. of Ancylostoma are found. The parasites are confined to certain well-defined areas along the coast of the Gulf of Mexico and on the southern part of the Pacific coast. The incidence of the disease is highest in young males under 15 and lowest in females over 15. A high percentage of the labouring population is infected and the maximum degree of infection is reached about 20 years. This decreases within the next ten years to about half and remains constant about this figure. Carr finds that there is no decrease of haemoglobin in cases with under 500 eggs per gramme, but that over that figure, there was a significant lowering of haemoglobin.

T. W. M. C.

HAUSHEER (W. C.) & HERRICK (C. A.). **The Place of the Smear in Hookworm Diagnosis.**—*Amer. Jl. Hyg.* 1926. July Supp. Vol. 6. pp. 136–148. With 1 text fig. [16 refs.]

The authors consider that the smear method of examining faeces is a useful routine method for the practitioner, as the cases missed will not be of clinical importance owing to the lightness of the infection. It also saves time by eliminating heavy infections before using a concentration technique. They state that patients negative to two 25 by 25 mm. smears may be considered to have less than 500 eggs per gramme, and so in campaign work the method is valuable to determine when to discontinue treatment. The smear method is accurate for over 500 eggs per gramme, doubtful for from 300–500, and highly inaccurate for under 300 eggs per gramme of faeces.

T. W. M. C.

HUNG (S. L.). Ueber den Nachweis von Hakenwurmeiern im Kote, den Wert ihrer quantitativen Bestimmung und eine einfache neue Methode für letztere. **[The Demonstration of Hookworm Eggs in Faeces. A Simple Method for their Quantitative Estimation.]**—*Arch. f. Schiffs- u. Trop. -Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 399–342. With 3 text figs. [34 refs.]

Hung discusses the merits of various egg collecting techniques in common use for the estimating of numbers of hookworm eggs present in faeces (BASS, FÜLLEBORN, KOFOID & BARBER, WILLIS, LANE, STOLL, and CALDWELL). He describes a new technique which he declares compares very favourably with previous methods, being faster than the Stoll and as accurate as the Lane. This he calls the " Hamburg Cover-slip method."

A circular glass vessel (about 5 cm. in diameter) with a hollow sunk into the base is used, but this may easily be improvised by the use of paraffin wax. In the hollow is placed 2 gm. of faeces and then saturated salt solution is poured in to cover the mass. After ten minutes three coverslips, which are allowed to float on the surface, are removed and placed on slides and the number of eggs under each is counted. Using the formula $\frac{a \pi r^2}{n^2}$ (a, average number of eggs per coverslip, r, radius of vessel, and $n^2$, area of coverslip) he obtains the number of eggs in 2 gm. of faeces. The following corrections have been found necessary:

| | | |
|---|---|---|
| when the total number is under 300 | ... | no correction. |
| between 300 and 500 | ... | increase by 1/14 |
| 500 and 650 | ... | increase by 1/5 |
| over 650 | ... | increased by 1/3 |

T. W. M. C.

HILL (Rolla B.). **The Estimation of the Number of Hookworms harbored, by the Use of the Dilution Egg Count Method.**—*Amer. Jl. Hyg.* 1926. July Supp. Vol. 6. pp. 19–41. [10 refs.]

In 1924, STOLL pointed out that the number of eggs per gramme of faeces reflects the degree of infestation in numbers of hookworms, but as his factor was derived from a small number of cases only, Hill decided to check his results from a larger series. The writer states that " the conditions which influence egg production are not yet fully understood " and at present all factors give somewhat varying results. Moreover, the methods by which these are calculated are not above suspicion. In this series, 93 cases were fully studied, all the faeces were collected over a period of two or three days and the eggs per gramme estimated by the Stoll technique. All the worms (*Necator americanus* was almost exclusively present) were then expelled with a carbon tetrachloride and chenopodium treatment (only cases in which all the parasites were expelled are included in the series). Using the same methods as STOLL, it was found that the number of eggs per female worm per day amounted to 2,693, while the eggs per gramme per female were 18·3—Stoll's factor being 44 or over twice as large. The author suggests that all counts per gramme should be reduced to a basis of formed stools for purposes of comparison.

T. W. M. C.

SOPER (Fred L.) **Comparison of Stoll and Lane Egg-Count Methods for the Estimation of Hookworm Infestation.**—*Amer. Jl. Hyg.* 1926. July Supp. Vol. 6. pp. 62–102. With 17 text figs. [12 refs.]

The author used LANE'S technique modified by stirring the contents of the tube by means of a small wire rod between each spin. He found that this resulted in a higher perçentage of eggs in all spins except the first, but that in some cases as many as 30 spins were necessary to recover all the eggs in heavy infections. He finds that after the fourth spin as many as 35·6 per cent. of ova are still remaining, and considers that the Lane method must be pushed to finality to be of value as a measure of the number of eggs present—a time consuming procedure when used for field work. On the other hand, it is excellent for picking up light infections. The Stoll technique does not secure an even distribution of eggs, but when more than one count is made they tend to be compensatory. This method is inferior to LANE's as a measure of rate of infection in groups with lightly infected individuals; but Soper believes that average Stoll counts are as reliable as average Lane counts, in estimating the degree of infestation of groups containing lightly infested individuals and are superior with heavily infested individuals.

T. W. M. C.

HAUSHEER (W. C.), HERRICK (C. A.) & PEARSE (A. S.). **Evaluation of the Methods of Stoll and Lane in Light Hookworm Infections, and Accuracy in Diagnosis of the Willis Floatation Method.** —*Amer. Jl. Hyg.* 1926. July Supp. Vol. 6. pp. 118-135. With 1 text fig. [16 refs.].

Using the Lane technique " pushed to finality " and both small and large drop Stoll methods (this *Bulletin*, Vol. 23, p. 776) for a series of 70 stools, the authors consider that the D. C. F. method gave extremely accurate results in diagnosis, but it was more time consuming than the dilution methods, which indicated a greater number of eggs present than did the D. C. F. They found that in cases with 600 or more eggs per gram, the small drop dilution method was as accurate as the large drop, but that it was useless for stools with much below 200 e.p.g. A study of Willis flotation method showed that provided that faeces are thoroughly comminuted in the salt solution, that salt with a Sp. Gr. of 1,150 to 1,200 is used and that the specimens are promptly examined before the salt destroys the ova, the diagnostic results are extremely good—the few cases missed being under 100 e.p.g.

T. W. M. C.

ALFREDO DUARTE (A.). Estudio e importancia del indice cuantitativo de la infección por la uncinaria, según el procedimiento de Stoll. [**The Quantitative Index of Hookworm Infection by Stoll's Method.**] —*Repert. de Med. y Cirug.* Bogota. 1925. Dec. Vol. 17. No. 3. (195.) pp. 139-173. With 5 charts in text.

Duarte has made a detailed study of 700 cases by Stoll's method of counting ova in human stools. This simple method gives in his opinion precise indications of the number of eggs present. The manner of egg counting is useful for other purposes, for ascaris and whipworm eggs can be estimated equally well. Stoll's technique may be applied to ascertain the number of worms present in an individual. The larger the number of persons unsuspected of hookworm infection who are examined, the more accurate the results.

R. T. L.

USAMI (Kenichi). Ueber eine neue Züchtungsmethode der Ankylostomumeier, insbesondere ueber die Gewinnungsmethode der ganz sauberen Ankylostomumlarven. [**A New Culture Method for Ancylostome Eggs.**]—*Wien. Klin. Woch.* 1926. May 20. Vol. 39. No. 21. pp. 595-597.

Usami points out, that there are many methods of searching for eggs in stools, but none are absolutely reliable. He prefers to use the following technique, which is based on the recognition of the larvae which hatch out from the eggs. The faeces are mixed with 5 or 6 times their bulk of powdered charcoal and made into a paste with water. The mass is spread over the bottom of a petri dish (to a depth of about 1/3 cm.) and incubated at about 37° C for three or four days. The surface of the culture is then covered with a layer of melted agar (a 2 per cent. solution which has been cooled to about the same temperature as the culture before application). The agar which forms a layer of about 1/3 cm. is allowed to solidify and is covered with water at a suitable temperature for about twenty minutes. The water is then decanted and examined, together with the water of condensation on the lid of the petri dish, for the presence of larvae. If none are present the water is allowed to stand on the agar for 24 hours. If no larvae are found, then, the presumption is that no eggs were present. This technique is called by Usami the " Agar covering method " ; but as sometimes particles of culture material escape into the water at the edge of the dish, he has a modification specially designed to secure clean cultures, which is called the " Agar hollow method." The agar is poured over the culture as before and a watch glass is pressed down on to its surface so as to form a hollow, the bottom of which is ½ cm. from the top of the culture. When the agar is solid, the watch glass is removed, and the water is poured into the hollow, and the larvae congregate there, free from any faecal material.

T. W. M. C.

FÜLLEBORN (F.) Experimenteller Nachweis für den Uebergang von Hakenwurmlarven aus dem Blute der Lungenarterien in die vom grossen Kreislauf versorgten Organe. [**Experimental Proof of the Passage of Hookworm Larvae from the Blood of the Pulmonary Artery to the Organs supplied by the Greater Circulation.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Nov. 1. Vol. 30. No. 11. pp. 679–684. [12 refs.]

Fülleborn has conducted a series of experiments on rabbits with the larvae of *Uncinaria stenocephala,* of the dog, and finds that 24 minutes and 6¼ hours after the injection of the larvae into the pulmonary artery a few may be found in the brain and kidneys. These larvae are considerably thicker than the infective larvae of *Strongyloides,* and are accordingly less able than that species to pass through the narrow capillaries of the lungs. Nevertheless, they are in some instances able to do this and so escape from the pulmonary artery into the pulmonary vein.

T. W. M. C.

YOKOGAWA (S.). **On the Oral Infection by the Hookworm.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Nov. 1. Vol. 30. No. 11. pp. 663–679. [1 ref.]

———. **On Oral Infection by** *Ankylostoma duodenale.*—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* pp. 347–349.

Yokogawa has fed infective larvae of *A. caninum* to tracheotomized dogs and finds that the larvae appear to develop normally in the intestine without leaving it, as no larvae could be found in the trachea after several careful searches daily, until the animal was destroyed. A very few (6 out of 3,059) were found in the lungs on autopsy, but he considers these as strays. He concludes that the pulmonary route is not essential for their development. He found also, in comparing larvae which had passed through the lungs, with infective larvae from cultures, that the latter displayed more resistance to artificial and natural gastric juices. Mature larvae of *A. duodenale* and *A. caninum* which had passed through the lungs of rabbits and guineapigs (i.e., " improper " hosts) were fed to other guineapigs and were found 24–28 hours later in the lungs, trachea and oesophagus. These were fed again to a young guineapig and to a mouse and 24–48 hours later were recovered from the lungs and trachea. He believes that this demonstrates that larvae which pass through the lungs do not acquire any particular property as the result of this journey; and that larvae fed to an abnormal host will continue to repeat this cycle until they die or are voided with the faeces. He concludes that hookworms do not leave the intestine of their proper host when swallowed, and that they migrate from the intestine of unsuitable hosts merely to escape from an uncongenial medium.

T. W. M. C.

HESS (Hermann). Die Hakenwurmkrankheit, unter besonderer Berücksichtigung der nervösen Erscheinungen, Temperatursteigerung und Allotriophagie. [**Nervous Symptoms, Fever and Pica in Hookworm Disease.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Apr. 1. Vol. 30. No. 4. pp. 141–148. [42 refs.]

The intensive investigations of LÖBKER, BRUNS and LUTZ failed to corroborate the presence of the nervous symptoms reported by SANDWITH and ASHFORD, as being connected with hookworm disease, as these could generally be ascribed to concurrent pellagra, beriberi or other deficiency diseases. There is still no agreement as to the occurrence of fever, or as to its etiology, but secondary infection of small intestinal wounds is probably partly responsible. Allotriophagy (pica) has seldom been observed in Europe.

R. T. L.

VAN THIEL (P. H.). Diagnostic différentiel des larves strongyloides du *Necator americanus* et de l'*Ankylostoma caninum*. [**Differentiation of the Larvae of *N. americanus* and *A. caninum*.**]—*Ann. Parasit. Humaine et Comparée.* 1926. July 1. Vol. 4. No. 3. pp. 228–232. With 1 text fig. [8 refs.]

Van Thiel adds further details to his previous paper (this *Bulletin*, Vol. 21, p. 969) on this subject, but promises a future still more detailed paper. In addition to the differences in the cephalic end and in the striations of the cuticle, already mentioned, he finds that the tail of *Necator* is the more pointed, the wall of the oesophageal bulb is more irregular, and the oesophageal intestinal junction is as wide as the bulb in *Necator* while it is much narrower in *Ancylostoma caninum*. A figure of the anterior end of a Necator larva is given.

T. W. M. C.

HILL (Rolla B.). **Hookworm Reinfestation for Three Years after Treatment in a Sanitated Area in Porto Rico, and its Bearing on Permanent Hookworm Control in the Group Studied.**—*Amer. Jl. Hyg.* 1926. July Supp. Vol. 6. pp. 103–117. With 1 text fig. [10 refs.]

Using the dilution egg count method, a group of 300 people in an area in Porto Rico, which enjoyed a fair measure of sanitation, was examined before treatment and immediately after, and one and three years later. The incidence of hookworm infection was reduced from 90 to 19 per cent.; but the rate rose rapidly at first though more gradually afterwards, until after three years 58 per cent. were infected. The intensity of the infection was reduced 98 per cent. by treatment, but this only rose to 20 per cent. of the original in the same time. The greatest increase was in the farmer class, but children and old people were found to be acquiring hookworms more quickly than other groups. The writer considers that these results indicate the value of the intensive system of treatment developed by HOWARD in 1919. [See this *Bulletin*, Vol. 14, p. 159.]

T. W. M. C.

STILES (C. W.). **Comparative Value of Sodium Hydroxide, Copper Sulphate, and Fermentation in Disinfecting Human Excreta containing Eggs of Hookworms** (*Necator americanus*) **and of Ascaris** (*Ascaris lumbricoides*).—*Jl. Parasit.* 1926. Sept. Vol. 13. No. 1. pp. 47–55.

A 1 per cent. solution of caustic soda destroys hookworm eggs in excreta in 14 days in summer, 2 per cent. in 9 days, 5 per cent. in 6 days and a ·5 per cent. in four weeks. Under winter conditions with a 1 per cent. solution they live for 6 weeks and with a ·5 per cent. solution for 8 weeks. Copper sulphate may be as safe a disinfectant, but the question is still *sub judice.* 1 per cent. sulphuric acid, 1 per cent. calcium hypochlorite, fermentation and pine tar disinfectant are inferior to caustic soda. Fermentation is adequate if ample moisture is present and about 5 months time is allowed. It is suggested that so far as hookworms are concerned 1–5 per cent. caustic soda is one of the most efficient disinfectants for human excreta, and if properly treated thus, the night soil may be safely (as far as hookworm is concerned) used for fertilizer.

T. W. M. C.

EARLY (P. V.). **A Case of Subacute Combined Degeneration of the Cord associated with Ankylostomum duodenale and Achlorhydria.**—*China Med. Jl.* 1926. May. Vol. 40. No. 5. pp. 465–466.

The author gives a brief clinical record of a case shewing sub-acute combined degeneration of the cord in which the associated anaemia was possibly due in whole or in part to hookworm. The number of red cells was 750,000 per cmm. The haemoglobin on the Tallqvist scale was 10 per cent. The stained film did not present the typical picture of pernicious anaemia. No autopsy was obtained. [The report gives no indication of the intensity of hookworm infestation, although the presence of worms was ascertained by a microscopical examination of the stool.]

R. T. L.

PERERA (David). **Ankylostomiasis. Some Notes on 4,000 Cases, treated from October 1914 to April 1925.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 341–346.

The drugs used against hookworm in the Poonagalla Group Hospital, Ceylon, are normally oil of chenopodium and, a week later, thymol, a saline purge being given on each occasion. Oil of chenopodium should not be given to patients with jaundice. Diarrhoea and dysentery are frequently caused by hookworms—in the latter case, beta-napthol and thymol are the safer drugs to use. The writer emphasizes the establishment of an effective sanitation as the first stage in hookworm campaigns.

R. T. L.

MANALANG (C.). **Ankylostomiasis, IV—Chenopodium Treatment.**—*Jl. Philippine Islands Med. Assoc.* 1926. July. Vol. 6. No. 7. pp. 226–228..

———. **Ankylostomiasis, V—Thymol Treatment.**—*Ibid.* pp. 228–229.

Chenopodium in 3 cc. doses was administered to 57 patients suffering from hookworm. One dose cured 23, two doses cured 7 out of 21 and 3 doses cured 7 out of 8. In the case of those requiring more than one dose, 89·5 per cent. of the worms were expelled with the first dose. Ancylostoma was found to be less vulnerable than Necator.

Similarly 2·6 gm. of thymol was given once in 38 cases, curing 10, twice in 15 cases, curing 3, and 3 times in 10, curing 5. In the double treatments, 74·1 per cent. of the worms were expelled after the first treatment. Here again Necator was more vulnerable than Ancylostoma.

R. T. L.

STRONG (W. M.). **Carbon Tetrachloride and Croton Oil in Treatment of Hookworm Infections.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. p. 132. [1 ref.]

Strong administers a quarter to half a minim of croton oil with 30 minims of carbon tetrachloride and has found no ill effects in " many thousands of cases " in Papua. He contrasts the weight of the croton oil with that of the Epsom salts, the quantities for 10,000 cases being less than half a pound of the former and about 480 lbs of the latter. Another advantage is that croton oil can be mixed with carbon tetrachloride in bulk.

T. W. M. C.

SOPER (Fred L.). **Tetrachlorethylene ($C_2$ $Cl_4$) in the Treatment of Hookworm Disease.**—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 451–454. [2 refs.]

Soper has treated 13 patients with tetrachlorethylene and another 13 with a mixture of chenopodium and tetrachlorethylene, and finds that carbon tetrachloride alone or with chenopodium is more effective for *Necator*; and with chenopodium, is more effective for *Ancylostoma* than tetrachlorethylene. He concludes that it has no advantage over carbon tetrachloride for *Necator* infections, but that further tests should be made with *Ancylostoma.*

T. W. M. C.

LANE (Clayton). **The Treatment of Ankylostomiasis.**—*Lancet.* 1926. Aug. 14. pp. 346–347.

All anthelmintic treatment is a compromise between efficiency and safety. Of the five lines of treatment in vogue the mixture of chloroform and eucalyptus has produced too much anxiety to be now advocated, at least for mass treatment. The optimum dose of beta-naphthol has been placed at 2 grains, but even in this dosage the blood destruction, which has caused in larger doses (3·6 gr. or less) a number of deaths with haematuria, is evident from an invariable diazo-reaction in the urine. Thymol in optimum dosage of 4 grains has apparently no death indubitably attributable to it. Oil of chenopodium in SCHÜFFNER and VERVOORT's optimum dosage of 1·2 cc. also has a good record, although the error of taking drops as equivalent to minims has led to a number of fatalities. Its active principle, ascaridol, is held by NELSON to comprise 50 to 70 per cent. of the oil. Carbon tetrachloride in its " therapeutic dosage " of 3 cc. has killed a number of persons and doses of 1·5 cc. have caused grave apprehension or unexpected death, the risk (of fatty degeneration and necrosis of viscera) being lessened by glucose ingestion. The author is of opinion that " Thymol, and oil of chenopodium of known ascaridol content, used in respective dosage of 4 g. and 1·2 c. cm., are safe drugs, the latter being, apparently, the more effective where *A. duodenale* is concerned. The choice between the two will mainly be determined by secondary considerations, such as palatability and, under mass conditions, ease and cost of administration."

[For the treatment of clinical cases under adequate supervision one or other of the known treatments may suffice ,but the immense problem of hookworm eradication by mass treatment of carriers can only be solved, in the author's view, by the discovery of some drug more specific in its toxicity to hookworm than any now known.] R. T. L.

LANE (Clayton). **Chenopodium for Ankylostomiasis.** [Correspondence.] —*Lancet.* 1926. Sept. 18. p. 624.

Lane points out that the constants in PAGET's paper* on the determination of ascaridol content of oil of chenopodium, are valueless unless applied to the genuine oil as they can easily be reproduced by adulteration. He draws attention to the fact also that the oil of chenopodium of B.W. & Co. has an ascaridol content of 90 per cent. and so 1·2 cc. of this oil is equivalent to 1·8 cc. of an ordinary sample. Accordingly the ordinary dose of this particular oil must be only 0·8 cc. T. W. M. C.

i. BLAJINE (A. N.). Contribution à l'étude l'ankylostomase en Abchasie. [**Ankylostomiasis at Abchasie.**]—*Russian Jl. Trop. Med.* 1926. No. 5. French summary p. 78. [In Russian.]

ii. LINDTROP (G. T.). Notes sur les foyers endémiques d'ankylostomiase en Transcaucasie avec un note court sur les conditions helmintologiques de la population de l'Azerbaidjean. [**Endemic Foci of Ankylostomiasis in Transcaucasus.**]—*Ibid.* French summary p. 78. [In Russian.]

iii. RAMÉRY. Foyer d'ankylostomiase à Menzel-bou-Zelfa. [**Focus of Ankylostomiasis at Menzel-bou-Zelfa, Tunis.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 154–156.

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* *Analyst.* 1926. Vol. 51, p. 170.

iv. MANALANG (Cristobal). **Ankylostomiasis. III. Hookworm Counts and Classification among Hospital Patients.**—*Jl. Philippine Islands Med. Assoc.* 1926. June. Vol. 6. No. 6. pp. 192–196.

v. OGATA (Seiji). **[Studies on the Prevention of the Ancylostomiasis. Communication II. On the Attitudes of the Larvae of the Ancylostomes.]**—*Osaka Igakkwai Zasshi* (*Jl. Osaka Med. Soc.*). 1925. Nov. Vol. 24. No. 11. [Summarized in *Japan Med. World.* 1926. June 15. Vol. 6. No. 6. pp. 152–153.]

i. *Necator americanus* was found for the first time in Abchasie a few years ago, but since then seven other cases have been recorded.

ii. Lindtrop has observed endemic foci of hookworm disease in two districts in western Transcaucasia. The disease has also been observed near Batoum.

iii. Ramery has found, in three cases examined, hookworm eggs, but he considers that further investigations will disclose more infections in this region.

iv. Of nearly 5,000 worms recovered from 136 cases in Zamboanga, 14·5 per cent. only were *Ancylostoma duodenale*, the remainder being *Necator americanus.*

v. Ancylostome larvae do not survive a temperature of 60° C. for 3 seconds, 55° C. for 10 seconds, 50° C. for 3 minutes, 47° C. for 20 minutes, and 45° C. for one hour. The optimum temperature appears to be 30° to 35° C.

T. W. M. C.

i. CASTEX (M. R.) & GREENWAY (D.). Parasitose intestinale. **[Intestinal Parasitism.]**—*C.R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. pp. 1379–1381.

ii. FUJII (Tamotsu), SAITO (Setsu) & SHIONOYA (Hisashi). **[On the Intestinal Parasites of the Ainus (or the Aboriginal Tribes found in Hokkaido), as they are found by the Fecal Examination.]**—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1926. Apr. No. 2468. [Summarized in *Japan Med. World.* 1926. Aug. 15. Vol. 6. No. 8. pp. 220–221.]

iii. GÉNEVRAY. Parasites intestinaux et coolies indochinois en Nouvelle-Calédonie. **[Intestinal Parasites and Indochinese Coolies in New Caledonia.]**—*Ann. de Méd. et de Pharm. Colon.* 1926. Apr.–May–June. Vol. 24. No. 2. pp. 215–218.

iv. BOISSEAU (R.). Le parasitisme intestinal au Congo français. **[Intestinal Parasitism in French Congo.]**—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 714–718. [4 refs.]

v. GOURFINKELL (M.). Sur la question de l'helminthiase dans les asiles des enfants défectueux du réseau d'Odessa. **[Helminth Infections in Institutes for Defectives at Odessa.]**—*Russian Jl. Trop. Med.* 1926. No. 5. French summary pp. 78–79. [In Russian.]

vi. EGUCHI (Suyewo). **[Some Knowledge on the Mutual Relation among the Parasites of the Wild Beasts, especially Ferocious Species and Man.]** —*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1925. Nov. Vol. 32. No. 6. [Summarized in *Japan Med. World.* 1926. Apr. 15. Vol. 6. No. 4. pp. 90–91.]

i. In the Argentine, the following helminths are recorded by the authors: Whipworm (15 cases), *Taenia saginata* (3 cases), and *Hymenolepis nana* (3 cases).

ii. The Ainus or aboriginal inhabitants of Hokkaido do not use excrement as do the Japanese farmers, but they are very primitive in their habits. An examination of 314 showed that only 4 per cent. were free from parasites. Of the remainder 87 per cent. harboured Ascaris, 43 per cent. whipworm, 4 per cent. hookworms, 1·3 per cent. *Trichostrongylus orientalis*, and 3 per cent. Dibothriocephalus.

iii. Intestinal parasites are common in New Caledonia. Of 88 "healthy" persons examined either by means of a faecal smear or by means of the Willis technique, 83 harboured Trichocephalus, 79 *Necator americanus*, 72 Ascaris, and 15 Clonorchis.

iv. The stools of 840 natives from one year old upwards, of the French Congo, were examined for parasites and 81 per cent. were found to harbour hookworms, 68 per cent. whipworms, and 65 per cent. ascaris. None were found uninfested and many contained eggs of all three.

v. Between 60 and 70 per cent. of the children in institutes for the defective in Odessa are infected with helminths—the commonest species being Trichuris, Ascaris, and *Hymenolepis nana*.

vi. Eguchi has found *Clonorchis sinensis* in the camel, *Paragonimus westermanii* in the Malay tiger, and *Sparganum mansoni* and *Dibothriocephalus latus* in the tiger, lion, and panther.

i. BABA (Fusao). [**On the Efficacious Property of the Anthelminthic "Macunin."**]—*Tokyo Igakkwai Zasshi* (*Jl. Tokyo Med. Soc.*). 1926. Mar. Vol. 49. No. 3. [Summarized in *Japan Med. World.* 1926. Oct. 15. Vol. 6. No. 10. pp. 287–288.]

ii. DUMAS (R.). Déparasitation intestinale par le tétrachlorure de carbone. [**Clearance of Intestinal Parasites by Carbon Tetrachloride.**] —*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 719–722. [3 refs.]

iii. HEKTOEN (Ludvig). **The Precipitin Reactions of Extracts of Various Animal Parasites.**—*Jl. Infect. Dis.* 1926. Oct. Vol. 39. No. 4. pp. 342–344. [6 refs.]

i. "Macunin," in *in vitro* experiments, was found to have a paralysing effect on the pig Ascaris—a 2 per cent. concentration depriving it of motility in an hour at 37° C.; 10 grains per kilo body weight by subcutaneous injection and twice that amount by oral administration is lethal to rabbits.

ii. Dumas considers that carbon tetrachloride should receive more attention as an anthelmintic on account of the simplicity of treatment, ease of administration, and absence of toxicity.

iii. Precipitin reactions of materials derived from animal parasites follow the general rule of species-specificness. Extension of the study of animal parasites by immunological methods is indicated.

T. W. M. C.

ABELARDO LARA (N.). Algunos puntos de patologia tropical. Ankilostomiasis. Anguilulosis. Niguas. Avicularia. Tokelau.—*Rev. Méd. de Yucatán.* 1926. June. Vol. 14. No. 1. pp. 6–12.

BRACHETTO-BRIAN (D.). Coloración de microfilarias por el procedimiento de Jiménez de Asúa.—*Semana Méd.* 1926. June 17. Vol. 33. No. 24. (1692). pp. 1333–1334. With 1 text fig. [1 ref.]

BRADLEY (Burton). Notes on Larval Trematodes from New South Wales.—*Med. Jl. Australia.* 1926. Oct. 30. 13th Year. Vol. 2. No. 18. pp. 573–578. With 14 figs. on 1 plate. [17 refs.]

BRAILSFORD (James F.). Man as the Intermediate Host of the *Taenia Solium*. [Correspondence.]—*Brit. Med. Jl.* 1926. Sept. 25. p. 579.

LEON (N.). Sur la bifurcation du *Dibothriocephalus latus*.—*Ann. Parasit. Humaine et Comparée.* 1926. July 1. Vol. 4. No. 3. pp. 236–240. With 2 text figs. [7 refs.]

SCHOPFER (William H.). Recherches physico-chimiques sur les liquides de parasites. (Ascaris) II.—*Parasitology.* 1926. Sept. Vol. 18. No. 3. pp. 277–282. With 5 charts. [4 refs.]

TSUCHIMOCHI (Katsuji). On Larval Flukes infesting *Limnaea* in Formosa.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. Aug. No. 257. English summary pp. 1–4. [In Japanese. With 15 figs. on plates.]

# LEPROSY.

ABBATUCCI (S.). La lèpre dans les colonies françaises; sa prophylaxie et son traitement. [**Leprosy in the French Colonies; Prophylaxis and Treatment.**]—*Presse Méd.* 1926. Sept. 8. Vol. 34. No. 72. pp. 1147–1148. [2 refs.]

The first part of this paper gives the same data regarding the prevalence of leprosy in French colonies as were dealt with in this *Bulletin* Vol. 23. pp. 836. Part II deals with prophylaxis in France, where 194 lepers have been treated in the hospital Saint-Louis between 1919 and 1923. Nearly 200 are believed to exist in Paris, but no laws exist under which they can be controlled.

L. Rogers.

MONTPELLIER (J.) & PINELLI (A.). La lèpre chez les indigènes de l'Algérie. [**Leprosy in Algerian Natives.**]—*Rev. Prat. Malad. des Pays Chauds.* 1926. June. Year 5. Vol. 6. No. 4. pp. 217–225. With 1 map. [2 refs.]

The authors give a table of 27 indigenous cases of leprosy in Algeria, including 14 nodular and 3 mixed of infective types; a focus of infection exists in the centre of the country in the Kabyle area.

L. R.

UCHIDA (Shigeo). [**A Statistical Study on Leprosy in Okayama Prefecture.**]—*Hifuka Hitsunyokika Zasshi* (*Jl. Dermat. & Urol.*). 1926. Jan. Vol. 26. No. 1. [Summarized in *Japan Med. World.* 1926. Sept. 15. Vol. 6. No. 9. pp. 255–256.]

Among 40,527 out-patients at the Okayama hospital the writer found 320, or 0·78 per cent., to be lepers; 70 per cent. were males. 50·7 per cent. of the cases were macular, 29·7 per cent. nerve, 13·4 per cent. nodular, and 5·9 per cent. mixed; the ages varied from 10 to 82.

L. R.

WILSON (R. M.). **Leprosy in Korea.**—*Jl. Amer. Med. Assoc.* 1926. Oct. 9. Vol. 87. No. 15. pp. 1211–1212. With 3 text figs. [1 ref.]

The author has studied 938 lepers in the colonies at Kwanju and Fusan, and states that the number in Korea has been variously estimated at from 5,000 to 20,000. The average duration on admission of the cases was 3·3 years. He has been using Muir's method in injecting pure Ol. Hydnocarpus wightiana with 1 per cent. camphor, which is much cheaper than the esters, in 4 to 8 cc. doses weekly, while at Fusan the esters were used with such satisfactory results that 238 patients have now been parolled and a further number will soon be sent out. He continues: "We have seen apparent cures in 30 per cent. in spite of the fact that many of our cases have come in the advanced stages." Further, over 75 per cent. had the disease arrested so that they could do active work, which he agrees with MUIR is an important element in the treatment.

L. R.

TOULLEC. La lèpre à Canton. [**Leprosy at Canton.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. July–Aug.–Sept. Vol. 24. No. 3. pp. 362–369.

Canton alone is estimated to have 20,000 lepers. The Chinese believe the disease to be hereditary and also contagious essentially through sexual intercourse, and hold the peculiar view that a leper can be cured of his disease by having sexual intercourse ten times with healthy persons. Female lepers are led to prostitute themselves and males to commit rape, often on young children. The incubation period after infection through sexual intercourse is 100 days, during which the patient is infectious. Another method of cure is to disinter a recently buried infant and make a meal of the lower extremities. As Southern China is terribly afflicted with leprosy, these methods do not appear to be very effective.

A leprosorium has been founded on two islands near Sheklung by Catholic priests, one for males and one for females, with 3,173 admissions between September 26th 1913 and 1st January 1925. The local government gives a capitation grant toward the cost.

L. R.

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RANGEL (Mario). A prophylaxia da lepra no Brasil. O Lazaropolis do Prata no Pará. [**The Prophylaxis of Leprosy in Brazil. The Lazaropolis in Prata, Pará.**]—*Rev. Med.-Cirurg. do Brasil.* 1926. Nov. Vol. 34. No. 11. pp. 442–445.

The first agricultural leper-colony in Brazil was opened at Prata in June, 1924, and this paper gives a brief account of its working. 600 patients were chosen from a list of 2,200 registered cases. The selection was made in accordance with the following main ideas :—

1. Adult lepers of both sexes, who were sufficiently healthy to work and were qualified to do official duties or give instruction.
2. Lepers, of any age or sex, needing segregation and protection.
3. Those whose pathological condition or habits rendered them dangerous to the community.
4. Such as were likely to benefit by modern methods of treatment.
5. Well-to-do lepers who might wish to come in at their own expense.

The last lived separately. The poorer patients were divided into three classes : those under 14 years of age, lodged in separate pavilions, according to sex and state of health ; adults in fair condition, distributed in pavilions or houses on agricultural allotments and doing work graded to their capabilities ; those adults who were too ill to work.

The medical personnel consisted of two consultants and two nurses, one for males and one for females ; those patients unable to attend the consulting-rooms were visited at regular intervals. A time-table was arranged as regards meals, work, rest, recreation, etc. The farm was under the control of an agriculturist, with two subordinate overseers and twenty assistants (healthy) who directed the work of the patients. Different areas were given to the cultivation of millet, rice, cotton, plantations of pumpkins, etc.

The internal domestic arrangements were of a lenient order. The indigent leper was allowed to live with his wife, the cost of maintenance being borne by the State ; the well-to-do had his wife or some person responsible for his treatment, the expense being paid by the patient. Children free from leprosy, under five years of age, lived in a crèche or an adjoining orphanage.

All patients, well-to-do or poor, wore uniform. To avoid the circulation of paper-money, copper discs stamped with numbers 1 to 100 were used and periodically disinfected in an autoclave. Letters were posted in a special box and sterilized in an autoclave before being sent out.

The results appear so far to be very satisfactory and the patients happy and contented.

H. Harold Scott.

PUPO (Aguiar). Alguns trechos de uma conferencia sobre a lepra no Brasil. [**Jottings from the Conference on Leprosy in Brazil.**]—*Rev. Med.-Cirurg do Brasil.* 1926. Nov. Vol. 34. No. 11. pp. 445–446.

According to official returns of the Department of Hygiene, Brazil has an endemic index of leprosy of 0·8 per mille. In the northern parts, Maranhão, Pará, and Amazonas, there are 3,165 cases among a population of 2,221,000, or 1·4 per 1,000. In the capital of Pará, in 1922, the index was as high as 4 per 1,000, and in Minas, the richest and most populous of the Brazilian States, there are 10–12,000 lepers amongst a population of under 6,000,000, an incidence of 2 per mille.

With an increasing number of children and adolescents, there is an expectation of doubling this figure in the course of the next ten years. The remainder of the paper is devoted to the statistics of Norway and other places, in part culled from the records of ROGERS and MUIR.

H. H. S.

BALIÑA (Pedro L.) Lepra autóctona de la ciudad de Buenos Aires: Prophylaxis. [**Indigenous Leprosy in Buenos Aires: Prevention.**]—*Semana Méd.* 1926. Dec. 9. Vol. 33. No. 49. (1717). pp. 1552–1557. With 3 text figs.

In the twelve years prior to 1921 the author personally attended 142 cases of leprosy in the city of Buenos Aires, of which 14 were autochthonous. In the succeeding 5 years he attended 137 more, of which 20 were autochthonous. In other words, the total has increased by more than 100 per cent,, and the autochthonous by more than 200 per cent. Three recent patients are particularized, namely a married couple aged 74 and 73 years and their daughter, living about 100 metres from the Muñiz Leper Asylum. These cases are employed by the author to point a moral and adorn a tale. Apparently, there is a proposal to add another wing to the Muñiz Hospital, and the author having visited the home of the three lepers and finding swarms of flies, concludes that these insects have conveyed the disease from the hospital to his patients. "The prophylaxis of leprosy" he states "is impracticable in a city in which 200 lepers are confined. Rational treatment is impossible in urban asylums. Humanitarian reasons, apart from those of prophylaxis and treatment, should have them set free from the prison in which the lepers of Muñiz Hospital have to spend their lives and sent as soon as possible to the farm-colonies which the law demands to be established in accordance with general experience."

H. H. S.

PUENTE (José J.). Consideraciones sobre una estadística levantada entre los leprosos del hospital Muñiz. [**Statistics of Lepers at the Hospital Muñiz.**]—*Semana Méd.* 1926. Dec. 9. Vol. 33. No. 49 (1717). pp. 1557–1560. With 1 map in text.

The figures given refer to cases since July, 1925. A total of 209 has been seen, 164 males, 45 females. 21 of these (10 per cent.) were imported.

The districts whence 142 of the patients came are recorded, the chief of which are Santa Fe (46), Buenos Aires (24), Entre Rios (24), Corrientes (17), Córdoba (7), and Tucumán (6). As regards age, 10 per cent. were under ten years, 35 per cent. in the second decade, 25 per cent. in the third, after which there is a drop to 8 per cent. A sketch spot-map is given indicating the places whence the lepers came to the hospital at Muñiz.

H. H. S.

VAN ANDEL (M. A.). Contribution à l'iconographie de la lèpre. [**Representations of Leprosy.**]—*Janus.* 1926. July–Aug. Vol. 30. No. 4. pp. 192–194. With 2 figs. on 1 plate. [4 refs.]

The writer illustrates an architectural sculpture of the door of an old leprosarium at Gouda, Holland, which has a figure of a leper.

L. R.

MOLESWORTH (E. H.) **The Leprosy Problem.**—*Med. Jl. Australia.* 1926. Sept. 18. 13th year. Vol. 2. No. 12. pp. 365–381. With 2 text figs. [17 refs.]

This lengthy paper advocates the abandonment of compulsory segregation in Australia and criticizes the views in ROGERS and MUIR's book on leprosy regarding the value of this prophylactic measure. The writer holds that Europeans have more resisting power against infection than natives, and that in the dry temperate climate of most of the continent the danger of infection is too slight to justify compulsory segregation; although it only applies to bacteriologically positive cases segregation leads to hiding and avoidance of treatment in the early stages, notwithstanding treatment of a more hopeful nature is now available. He goes on to illustrate the difficulty in finding lepra bacilli in early and in some more advanced cases, and he refers to early work of Dr. G. H. TAYLOR in Sydney, who recorded in the *Australian Medical Gazette* of January 20th, 1896, examinations of large numbers of hospital attendances and discovered a number of early nerve cases. He verified three post mortem by finding lepra bacilli, but he was transferred to railway work on account of breach of discipline for not reporting his results officially. An account of the New South Wales Lazaret is given, where the author " was not at all satisfied that either the best methods and drugs were being used or that the best results were being realized." Chaulmoogra oil orally was largely relied on, while at the Peel Island settlement there is no resident medical officer and the treatment is largely routine.

L. R.

COCHRANE (Robt. G.). **Final Report on the Medical Work of the Mission to Lepers in India (including Burma).**—12 pp. With 1 map. London: The Mission to Lepers, 33 Henrietta St., W.C.2.

As the result of a prolonged tour in India, visiting the asylums, the location of which is well shown in the map, the writer strongly advocates the transformation of one of the larger and better leper institutions in each province into a sanatorium for the admission only of cases suitable for treatment; an adequate medical staff should allow of the best treatment being provided under favourable conditions, and the smaller institutions should be retained as asylums for the crippled chronic nerve cases unamenable to treatment. The new institutions will then be essentially hospitals for treating the earlier more amenable cases, whom they will attract, and arrest their disease before others have been infected; six or seven medical men will be required. "With this new outlook, the possibility of arresting the disease and finally stamping it out is slowly coming into sight," although it will take many decades if not centuries in India, on account of the great difficulties. Out-door dispensaries for treatment of early uninfective cases should be increased. A useful summary of the number of institutions and leper inmates in each province is appended.

L. R.

HOFFMANN (W. H.) & RAMOS BÁEZ (Pedro). Nuevas orientaciones sanitarias y terapeuticas sobre la lepra. [**New Ideas on Leprosy, from the Points of View of Hygiene and Therapy.**]—*Med. Argentina.* Buenos Aires. 1926. June. Vol. 5. No. 49. pp. 52–59.

In the early stages of the disease leprosy is as readily curable as syphilis or malaria by proper treatment. A patient, after injections of chaulmoogra, exhibited Herxheimer's reaction, showing that the theory of toxin-liberation is applicable to leprosy as to other diseases. Professer Hoffmann thinks that infection takes place by penetration of the skin of the hands and feet, and that the nasal localization of the bacilli occurs in the secondary stage. As regards treatment, one patient improved much on an antimonial preparation, Stibosan, and the authors suggest that it or some such drug be used in combination with chaulmoogra.

To deal properly with the disease in Cuba, the following measures are suggested:—

1. To obtain accurate statistics of prevalence and to look for cases in an early stage among the families and friends of those obviously infected. 2. Obligatory intensive treatment of early cases. 3. Compulsory isolation of all patients showing mutilation. 4. Isolation of the infected, either at home, if this can be carried out satisfactorily, or in hospital. 5. Prohibition of lepers from following certain occupations. 6. Separation and care of the children. 7. Establishment of centres with a man experienced in the disease at the head, for advice, diagnosis and treatment, and trained inspectors to search out early cases and ensure that no advanced cases are at large.

H. Harold Scott.

RODRIGUEZ (José N.). **Studies on Early Leprosy in Children of Lepers.** —*Philippine Jl. Sci.* 1926. Oct. Vol. 31. No. 2. pp. 115–144. With 1 text fig. & 3 plates. [19 refs.]

This valuable paper gives very important data worked out from many cases in the great Culion settlement of the Philippines, and it brings up to date the former study of 308 children by GOMEZ, and others. The number now dealt with is 398 at Culion at the close of 1924 out of 871 born in the colony since May, 1906, 398 having died and 75 having been sent away as non-lepers. Of those remaining 59, or 14·8 per cent. were or had been positive lepers., 11 or 2·8 per cent. were clinical lepers, 97 or 24·4 per cent. were suspicious and 231 or 58 per cent. were negative; thus, 42 per cent. either were lepers or had symptoms suspicious of the disease. The sex incidence was very similar, but the age incidence showed a great rise between 10 and 16 years, attributed to puberty lessening the resisting powers. Fifty per cent. of the confirmed lepers became positive between the ages of 3 and 6 years, the average being 5 year 9 months. There was no evidence of hereditary leprosy, and the possibility of an hereditary predisposition has been very carefully studied, but no conclusive evidence either way could be obtained, so that if it occurs at all it must play a very minor rôle in disseminating leprosy.

Placental transmission is next considered, acid-fast bacilli having been found in 4 of 15 placentas examined. E. V. PINEDA with improved technique is reported to have found them more frequently, yet all the evidence is against congenital infection. CURIE found only 14 claims for its occurrence in 25 years literature up to 1915, and no congenital case of leprosy was seen or reported in the 871 children born at Culion up to 1924. The writer has, however, seen suspicious lesions in six children of 3 to 6 months, in three of whom they became positive between the second and third years, so very early infection may occur, although the evidence is against congenital weakness due to leprosy in parents. Of 184 mothers treated during pregnancy, and 58 untreated, in each 50 per cent. of the offspring remained free from definite or suspicious leprosy, so no reduction in the incidence resulted from treating the expectant mothers.

The factors influencing transmission during infancy and early childhood are next considered. Of breast-fed infants only 11·6 per cent. became leprous against 16·9 per cent. with mixed feeding and 24 per cent. of bottle-fed children, indicating once more that badly nourished children are more liable, and that the mother's milk cannot be an important source of infection. In 3 cases, the portal of entry was evidently a scabies itch, but skin diseases as a whole did not predispose to infection. Former evidence showing more frequent infection from leper mothers than from fathers, owing to closer contact of the child with its mother, is confirmed, as well as the greater infectivity of cutaneous and mixed types than of nerve ones.

The initial or primary lesion was found in no less than 85 per cent. of the children who became decidedly leprous, as a single cutaneous lesion, but in the remaining 15 per cent., a generalized rash or multiple macules appeared simultaneously. The initial lesion appeared on the buttocks in 28·8 per cent., on the cheeks in 11·8, on the loins in 6·7, scapular region 1·7, arms 10·2 and legs 15·3 per cent. out of 45 cases, but they were never seen on the chest or abdomen. They consist of a pale macule most frequently, or may be pink macules or anaesthetic patches.

The effect of delayed segregation of the children of lepers is next considered, and the important conclusion is come to that the segregation of the children of lepers after the age of six months does not decrease the incidence of leprosy among them, nor does it delay the appearance of the disease, so that it is clearly imperative to remove them as soon as possible after birth from infection by their parents, as has been done successfully in Hawaii and India. Indeed, there was a higher leprosy ratio in those segregated after 6 months than in the unsegregated, attributable to infection having already taken place in the former, while the appearance of the disease was retarded by the better nourishment of those remaining with their parents. Of the children segregated from their parents at an average age of 3 years and 6 months 23 per cent. have become leprous.

The probable average period of incubation in both the segregated and the unsegregated children was 3 years and nine months, the younger children being more susceptible than the older ones, and the average age at infection is estimated to be two years. An observation period of children segregated from infected parents after the age of six months should be at least five years before they can be considered as probably free from infection and safe to mix with healthy children.

L. R.

HOPKINS (Ralph). **Leprosy with Special Reference to Self-Limiting Phases of the Disease.**—*Southern Med. Jl.* 1926. Nov. Vol. 19. No. 11. pp. 784–790.

Observation of many cases for a long time cannot fail to impress the tendency of leprosy in some of its phases to be a self-limiting disease, although the time required is very variable, and this indicates an elaboration in the host of a protective mechanism against Hansen's bacillus ; the occurrence may be either spontaneous or due to treatment. Acute manifestations occurring from time to time were found by the writer to respond to Fowler's arsenical solution and quinine, which he believes to be valuable in this phase ; the erythematous nodules which appear show very few lepra bacilli, being probably toxic in nature and tend to clear up again of themselves, while in the nerve form acute exacerbations of pain may occur. Such reactions may be produced by iodides, chaulmoogra oil injections, smallpox vaccine, anthrax or leprous vaccines, and in one case leech extract, etc., and may result in the destruction of myriads of lepra bacilli, followed by improvement in the lesions or their disappearance. He agrees with other observers that death is often due to intercurrent affections.

L. R.

TEBBUTT (A. H.). **Tuberculoid Leprosy.**—*Med. Jl. Australia.* 1926. Sept. 18. 13th year. Vol. 2. No. 12. pp. 381–386. With 12 figs. on 2 plates. [14 refs.]

The writer illustrates sections from leprous lesions showing giant cells very similar to those of tubercle, and is in agreement with German, rather than with other writers, in regarding them as leprous in nature, and not tubercle complications. He points out the danger of overlooking leprosy if this is not recognized.

L. R.

HAMILTON (George R.). **Leprosy acquired in a Lazaret.**—*Med. Jl. Australia.* 1926. Sept. 25. 13th year. Vol. 2. No. 13. pp. 420–422. With 2 text figs.

A white attendant at a lazaret and in close association with and friendly with some of the patients cut his left hand 13 years before manifesting signs of leprosy, which commenced with a reddish macule near the scar one inch in diameter.

L. R.

COCHRANE (Robert G.). **Nerve Enlargement in Leprosy.** [Memoranda.] —*Brit. Med. Jl.* 1926. Aug. 21. p. 343.

The writer in a letter narrates two cases of enlargement of the ulnar nerve and one of the great auricular nerve in the neck, the latter case not having been recognized at first as one of leprosy.

L. R.

i. LITTLE (E. Graham). **Acute Nodular Leprosy originating in this Country and Cured by Vaccine Treatment.**—*Brit. Med. Jl.* 1926. Dec. 4. pp. 1034–1035. With 3 figs. on special plate.

ii. LOW (George C.); MACLEOD (J. M. H.); MANSON-BAHR (P.); SEQUEIRA (J. H.).—*Ibid.* 1926. Dec. 11. p. 1141; iii. LITTLE (E. Graham); iv. DAVIES (J. H. T.); v. ROGERS (Leonard).—*Ibid.* Dec. 18. pp. 1195–1196; vi. LITTLE (E. Graham); vii. HASSON (J.).—*Ibid.* 1927. Jan. 1. p. 40. **Leprosy: its Transmission and Treatment.** [Correspondence.]

viii. LITTLE (E. G. Graham). **Case of Nodular Leprosy, previously shown; Improved under Treatment.**—*Proc. Roy. Soc. Med.* (Sect. of Dermat., pp. 30–31). 1926. Dec. Vol. 20. No. 2. pp. 100–101. [1 ref.]

i. A case of old standing leprosy in a Chinaman six months in this country showed an acute exacerbation of the disease in the form of an eruption of nodules, which disappeared under treatment with J. Hasson's vaccine and is reported as "cured" by this treatment. As pointed out by E. MUIR and others, such acute eruptions often clear up without any treatment whatever.

ii. The writers point out that the case neither originated in this country nor can be considered as "cured."

iii. Dr. Little acknowledges the truth of the contentions in the last noted letter and calls the case "cured as far as clinical and bacteriological evidence goes."

iv. This letter reports improvement in a case of leprosy on Hasson's vaccine, and says chaulmoogra oil preparations have proved useless in this country. [This is not the reviewer's experience.]

v. The writer quotes Dr. Little's statement that "it is the general experience" that chaulmoogra oil preparations have not fulfilled the expectations aroused by the writer, and asks if he is ignorant of the hundreds of successfully treated cases in the tropics, or if he thinks the few failures in this country outweigh the hundreds of successes in the hands of men with far larger experience than it is possible to obtain in this country?

vi. Dr. Little replies that he relied on his opportunities as editor of the Skin Diseases Section of the Tropical Diseases Bureau for his view of the uselessness of the chaulmoogra oil preparations. [The leprosy reviews do not appear to have been written by him since the improved treatments were commenced in 1915.]*

vii. J. Hasson maintains that his vaccine treatment is not a modification of former ones.

viii. This appears to be the same case as in i.

L. R.

SERRA (Alberto). Ricerche biologiche sull'infezione leprosa. Etiopatogenesi e linfoghiandole. III nota. [**Biological Researches on Leprosy; Pathogeny and Glandular Infection.**]—*Giorn. Ital. di Dermat. e Sifil.* 1926. Aug. Vol. 67. Year 61. No. 4. pp. 1109–1129. With 2 folding tables & 2 plates. [26 refs.]

Following up his previous communications on gland-involvement in leprosy, the author here goes more deeply into the question. This adenitis occurs in the following order of frequency:—inguinal, femoral, submaxillary, axillary, cervical and epitrochlear. It is an early sign; the glands are ovoid, varying in size from a bean to an egg, are hard, mobile, and indolent, and easily distinguishable from enlargements due to tuberculosis or syphilis. In a detailed table dealing with 33 patients he shows that in 4 cases of anaesthetic and 4 of the mixed form, examination of the gland-juice and the gland-pulp revealed lepra bacilli, although none were found in the blood or nasal mucus. In fact, only three had the bacilli in the peripheral blood.

Histological examination was made of glands in two cases during life and in 8 after death. Even when no change could be discovered by the unaided eye, there was microscopical evidence in the form of small fibrous nodules and necrotic foci with bacilli present. The deep glands presenting the most marked lesions were the bronchial and mesenteric, in a less degree the pre-lumbar and those at the portal fissure.

In a second table 12 subjects are considered from the point of view of their possible contact with leprous cases, often members of their family being affected, or they themselves being in attendance on patients. All 12 had enlarged glands and from each the bacillus was obtained, though only one had the organism in the nasal mucus. From three others it was found in the mucus after the administration of potassium iodide. By keeping some of these under observation for a long period the author was able to note the definite appearance of symptoms as the disease declared itself. In one case symptoms did not appear till seven years after the first examination when bacilli were found in the gland-juice.

The author, speaking of the pathogeny of leprosy on the basis of his researches, concludes that there is an analogy between leprosy in man and in rats, in that in the latter also the bacilli may for a long time (perhaps for life) be present in the glands without setting up a general infection. The importance of the recognition of the local infection in early stages is great for prophylaxis and for hopes of cure by treatment.

H. Harold Scott.

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* In truth the Leprosy reviews have never been written by Dr. Little. Doubtless when he was sectional Editor for Skin Diseases (1917–1922) he studied the Leprosy section of the *Bulletin*.

COCHRANE (R. G.) **Leprosy, with Special Reference to Prognosis.**—*Jl. Roy. Army Med. Corps.* 1926. Dec. Vol. 47. No. 6. pp. 423–429. [4 refs.]

After a brief general description of early leprosy, it is pointed out that few lepers die of the disease, which tends to become arrested, and in the majority of early cases this should result from treatment without any resulting deformity. " The outlook for the early skin leper is very much more hopeful than it was six years ago, because of the advance in knowledge and treatment." After all active signs are lost treatment should be continued for six months, and the patient should be examined for relapse every 3–6 months for five years.

L. R.

PINEDA (Eloy V.) & ROXAS-PINEDA (Elisa). Studies on the Serology of Leprosy, III. **The Kahn Precipitation Reaction in Leprosy.**—*Philippine Jl. Sci.* 1926. July. Vol. 30. No. 3. pp. 295–302. [17 refs.]

The sera from 250 cases of leprosy were tested by the Kahn precipitation test ; 36 were positive in some degree, 28 of whom were also clinically positive for syphilis or yaws, and treatment of 14 produced negative reactions in 12 and lessened the reaction in 2. 54 cases with lepra reaction all gave negative results, although it is in these that a positive Wassermann is most often obtained. The author therefore concludes that the Kahn precipitation test is negative in uncomplicated cases of leprosy, even when lepra reaction is present, so is preferable to the Wassermann test in detecting treponematous infections in lepers. It also has the same value as the latter test in yaws.

L. R.

ARGÜELLES (M. V.). **The Kahn Test in Leprosy.**—*Philippine Jl. Sci.* 1926. July. Vol. 30. No. 3. pp. 275–286. [13 refs.]

Summary and Conclusions.

" 1. One hundred non-leper sera, obtained from the venereal clinic and out-patient department of San Lazaro Hospital, were examined for the Wassermann and the Kahn tests. There was an agreement in the results of 93 per cent.

" 2. One hundred leper and leper-suspect sera were tested by the Wassermann reaction and by the precipitation test of Kahn.

" 3. There was very close agreement in the results of the Wassermann and the Kahn tests with a slight sensitiveness in favour of the Kahn test.

" 4. The Wassermann and the Kahn tests in leper patients are generally negative.

" 5. There was observed, in 1 per cent. of leper and leper-suspect sera, positive Wassermann reaction without any history or signs of syphilis or yaws. In confirmed leper sera, the Wassermann test was positive in 1·23 per cent. of the cases without any signs or history of syphilis or yaws. Kolmer and Denney found that 7·32 per cent. of non-syphilitic leper sera gave falsely positive Wassermann reaction.

" 6. The Kahn test was positive in 5 per cent. of leper and leper-suspect sera without any signs or history of syphilis or yaws. In confirmed-leper sera, the Kahn test was positive in 6·17 per cent. of the cases without any sign or history of syphilis or yaws.

"7. As far as lepers are concerned, the Kahn test is of greater value than the Wassermann test in excluding syphilis or yaws, and of less value in establishing the diagnosis of these two diseases."

L. R.

RUBINO (Miguel C.). Una nueva reacción serológica de la lepra. (Communicación leida en la Sociedad de Dermatologia y Sifiligrafia de Montevideo). [**A New Serological Reaction in Leprosy.**] —*Rev. Hig. y Sanidad Pecuarias.* 1926. Nov. Vol. 16. No. 11. pp. 772–777.

For this test the author prepares a suspension of sheep's corpuscles in the following way. The corpuscles are well washed with normal saline and made up to the original volume by the addition of 10 per cent. formalin. After 24 hours at room temperature, the corpuscles are repeatedly washed with normal saline, four times at least, and the product finally again brought to the original volume by adding saline, and a uniform emulsion is made.

One cc. of inactivated serum is mixed with an equal volume of the corpuscle suspension, shaken up and placed in the thermostat at 37° C. for an hour. In the case of a normal serum at the end of this time there is a dense suspension and, after some hours, a certain degree of sedimentation of red cells with an upper well-defined limit, and the surface layer quite clear.

With a leprous serum, in less than the hour, sometimes within a few minutes of being placed at 37° C., there is a fine flocculent suspension which increases in amount and falls to the bottom, leaving the supernatant fluid clear. Soon there is a dark layer of sedimented red corpuscles with a more or less completely clear layer of serum above it. The reaction takes place if to 1 cc. of the corpuscle suspension only 0·125 cc. of serum is added, but the best results are obtained with 0·5—1 cc.

No such result is given with non-formalized corpuscles, sheep or human, and the conclusion is drawn that the reaction is an "agglutinin-sedimentation" one, a quality imparted by formalizing the red cells.

Of 18 cases so tested, 12 were positive and 6 negative. In 3 the diagnosis was doubtful clinically and 2 of these proved positive. In 4 others which were diagnosed clinically as leprosy the result was negative.

713 sera from patients other than cases of leprosy were tested and positive results were "very rare" [the number is not stated], and even in these it was less distinct than in true cases of leprosy.

H. H. S.

LANDEIRO (Fausto). La vitesse de sédimentation des hématies chez les lépreux. [**Velocity of Sedimentation of Red Cells in Lepers.**]—*C.R. Soc. Biol.* 1926. Nov. 26. Vol. 95. No. 34. p. 1261. [2 refs.]

The writer confirms the observations of PALDROCK that in leprosy sedimentation of the red corpuscles occurs especially quickly, and finds this most marked in nodular and least in nerve cases, mixed cases being intermediate.

L. R.

BARGEHR (P.). Spezifische Hautreaktionen bei Lepra. **[Specific Skin Reactions in Leprosy.]**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. June 28. Vol. 47. No. 6. pp. 529–531. [1 ref.]

The following facts emerge from the author's experiments :—

(1) In people who have never come into contact with leprosy, inoculations with fresh, unaltered leproma substance produce a negative reaction.

(2) In persons who show no sign of existing leprosy, but have been for a long time in contact with lepers, a positive reaction occurs.

(3) In persons with active leprosy a negative reaction, but in very slight cases it may be positive.

(4) In lepers in whom after a long course the disease has been in a stationary condition for years without any active symptoms of leprosy, there is often a positive reaction.

These facts allow the following conclusions to be drawn :—

(1) Persons who have not come into contact with lepra bacilli have no specific protective substances.

(2) In persons who come much into contact with lepers there generally occurs a subliminal infection and formation of specific antibodies which produce immunity.

(3) In the case of existing leprosy the antibody is not formed in sufficient quantity to overcome the disease.

(4) Leprosy may often in the course of years be cured, as already pointed out by E. MUIR, presumably in consequence of a senile weakness of the bacillary strain.

L. R.

ENGEL-BEY (Fr.). Zur Therapie der Lepra. **[Treatment of Leprosy.]** —*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* · 1926. Vol. 30. No. 2. pp. 1–60. [64 refs.]

This paper gives a useful survey of the literature concerning the improved treatment of leprosy during the past few years, but contains very little original matter. As might be expected, it is largely an assertion of the value of the German preparation antileprol, although the author's claim that it is mainly used all over the world is quite untrue as regards the extensive tropical possessions of both England and France. He is in agreement with other writers that the ethyl esters of chaulmoogra oil are not a certain cure for advanced cases, and in urging the necessity of diagnosing and treating early cases. Treatment should be begun as soon as clincial signs manifest themselves without waiting for bacteria to be present. Such cases need not be segregated. Isolation has proved an unsatisfactory method of control by itself ; the people of infected areas know the early stages and will come forward for treatment if not compulsorily segregated, while voluntary leprosaria should be supplied to furnish the best treatment ; some patients, however, will not continue the treatment long enough for a complete cure. He advocates injections being given only once a week and the dose gradually raised, and unirritating preparations should be used, the ethyl esters being preferred by him.

L. R.

HERRERA-BATTEKE (P. P.) & WEST (Augustus P.). **Esters of Chaulmoogric Acid (Capryl, Allyl, Phenyl, Ortho Cresol, Meta Cresol, Para Cresol).**—*Philippine Jl. Sci.* 1926. Oct. Vol. 31. No. 2. pp. 161–168. [9 refs.]

The writers open with the statement that "The treatment of leprosy by means of the mixed ethyl esters obtained from the fatty acids of chaulmoogra oil has given excellent results." As, however, it is slow, it is desirable to prepare other chaulmoogra derivatives, which may, perhaps, have greater therapeutic value than the mixed chaulmoogra ethyl esters. After referring to the earlier work of POWER and more recently that of PERKINS in preparing propyl, butyl and amyl esters of the mixed chaulmoogra acids (which were not found at Culion to have any material advantages over the ethyl esters), the writers describe the highly technical processes by means of which they have prepared the capryl and allyl esters of chaulmoogric acid with capryl and allyl alcohols, respectively, in the presence of hydrogen and choline gas. Further the phenyl, ortho, cresol, and para cresol esters of chaulmoogric acid were prepared by treating chaulmoogric acid with the proper phenyl compound in the presence of phosphorus oxychloride. By work on such lines it is to be hoped that further material advances in the treatment of leprosy will eventually accrue.

L. R.

MUIR (E.). **The Treatment of Wassermann-Positive Cases of Leprosy by a New Oil-Soluble Mercury Preparation.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 291–292.

As a number of leprosy patients with a positive Wassermann improve rapidly on antisyphilitic treatment a combined treatment for both affections is desirable, and it appears to have been obtained in a new mercury preparation made by Dr. T. A. HENRY, of the Wellcome Research Laboratories, the chemical name of which is 2-myristoxymercuri-3-hydroxybenzaldehyde, or for convenience "Hg. 33." It is easily soluble to the extent of 0·25 per cent. in hydnocarpus oil and is only slightly more irritating subcutaneously than the oil alone. A table is given of 30 cases with Wassermann reaction treated in Calcutta, with almost invariable improvement, but most marked in those whose Wassermann reaction became negative, although no effect had been produced on the reaction by long previous courses of hydnocarpus oil alone. Before the combined treatment, 17 showed strongly positive and 13 moderately positive reactions: after the course, 8 were still strongly and 4 moderately positive, 2 doubtful, while 16 were negative, after one course of 15 injections in 10, and 2 to 4 such courses in the other 6. Its non-toxicity and ease of administration in hydnocarpus oil render it a safe and effective remedy in Wassermann positive lepers, while the cases remaining positive after the treatment still remained so after one or two courses of novarsenobillon; this indicates that it is at least as effective as the older remedy and it has the great advantage of being much safer to use in leprosy.

L. R.

LORTAT-JACOB & MORLAAS. Sur un cas de lèpre mixte traité par la cryothérapie. [**A Case of Mixed Leprosy treated by Cryotherapy.**] —*Bull. Soc. Française Dermat. et Syph.* 1926. July. No. 7. pp. 474–475.

An early case with believed long incubation showing lepromes on the face and extremities and lepra bacilli in the nasal mucus was treated with 3 applications of carbonic snow in addition to 4 grammes of novarsenobillon and 30 cc. of chaulmoogra oil, with promising results.

L. R.

PALMER (F. J.). **The Years Between. A Medical Retrospect.** —*Proc. Assam Branch Brit. Med. Assoc. Annual Meeting, Silchar, 1st & 2nd March, 1926.* pp. 25–32.

Some further remarks on the use of copper preparations in leprosy are recorded. Copper citrate is given orally in one grain pills morning and evening for 7 to 10 days with a similar period of remission, or weekly injections of 1½ to 2 grains of copper citrate after a previous course of 4 injections of 3 to 4 grains of bismuth sodium tartrate. Reactions followed by improvement may result and in some early cases the lesions have cleared up, but progress is slow and uncertain in more advanced ones.

L. R.

COELHO (Joao G.). Le *Carpotroche brasiliensis* dans le traitement de la lèpre. [*C. brasiliensis* **in the Treatment of Leprosy.**]—*Presse Méd.* 1926. Oct. 27. Vol. 34. No. 86. pp. 1357–1358. [3 refs.]

This tree grows abundantly in Brazil, and belongs to the same family as *Taraktogenos Kurzii*: it grows to a height of 50 feet, and its seeds yield an oil long used in indigenous medicine for skin diseases including leprosy. From it T. PECKOLT in 1869 isolated a crystalline substance, carpotrochin and an "acide carpotrochinique," and recommended it in the place of the more expensive chaulmoogra oil, and recently ethyl esters have been prepared by DEL VECHIO. ANDRÉ found the dextrorotatory power of the Brazil oil to be 53·40, that of *Taraktogenos Kurzii* being 48·40, while MACHADO has shown that two of the acids discovered by PECKOLT belong to the chaulmoogra series. Clinical tests by Professor TERRA of Rio de Janeiro, and others have shown the copper preparation of SEABRA is of value in leprosy, while the oil is being used in Brazil with good results and without severe reactions.

L. R.

PONS (R.) & CHASTEL. Essais sur l'action curative du vaccin antituberculeux B C G dans la lèpre. [**Curative Action of the Antituberculous Vaccine B. C. G. in Leprosy.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 520–521.

The writers have tried subcutaneous injections of 0·01 to 0·10 gm. of the antituberculous vaccine B.C.G. of the Saigon Pasteur Institute in 5 lepers. They produced temperatures of 39° to 40° C. and congestion of the erythematous patches, followed by disappearance of the patches, diminution of the nodules and general improvement; the lepra bacilli disappeared from the nasal mucus, but granular bacilli remained in some of the lesions. The vaccine produced abscesses when only diluted to contain 0·01 gm. in 2 cc. of fluid, but greater dilutions avoided them. The inquiry is proceeding, but they desire to call attention to the results so far obtained.

L. R.

DENNEY (O. E.). **The National Leper Home (Marine Hospital No. 66). Review of the More Important Activities during the Fiscal Year ended June 30, 1926.**—*Public Health Rep.* 1926. Nov. 12. Vol. 41. No. 46. pp. 2593–2597. With 8 figs. on 4 plates.

During the year ending June 30, 1926, there were 62 admissions and a total of 259 lepers present, and 3 were paroled with the disease arrested. Intravenous injections of mercurochrome, mercurophen, metaphen, bismuth, neosalvarsan and tryparsamide were tried, and both ultraviolet rays for nerve pains and ulcers and diathermy proved of value. " Treatment with chaulmoogra oil is being continued in a large group of patients, and, while no spectacular results have been obtained with either the oral administration of the crude oil or the intramuscular injection of its ethyl esters, it appears that definite improvement has followed in a sufficiently large percentage of cases to encourage the patients in the continuation of the treatment." The oil is now being given in larger doses in enteric capsules without any nausea in the few cases yet tried.

L. R.

PUPO (J. de Aguiar). Tratamento especifico da lepra pelo oleo de chaulmoogra e seus derivados. (Estudo das flacourtiaceas do Brazil). [**Specific Treatment of Leprosy by Chaulmoogra Oil and its Derivatives. (Study of the Flacourtiaceae of Brazil).**]—*Brazil Medico.* 1926. Aug. 7 & 14. Year 40. Vol. 2. Nos. 6 & 7. pp. 69–76; 85–90. [105 refs.]

The first part of this paper constitutes a succinct review of the question, with brief records of the history of the use of the plant, various species of it, the physical properties of the oil—specific gravity, melting point, rotatory power, etc.—and the chemistry of its active principles with graphic formulae of their constitution.

Next, the modes of administration, by mouth and by injection. Statistics as to the results of the former in 82 early cases and 88 in an advanced stage in the leprosarium of Louisiana are presented, 17 per cent. of the former being cured. nearly 50 per cent. more receiving considerable benefit. Of the latter, 20 per cent. showed definite, and another 28 per cent. slight improvement.

No statistics as to the results of the injection treatment are given. Notes culled from previous records are adduced as to the effect of the sodium derivatives of the acids and of the ethyl esters. The initial dose of the latter is 0·5 cc. and the maximum 4–5 cc., treatment continuing for two to four years.

Then follow some remarks upon the mechanism of the therapeutic action of non-saturated fatty acids, the benefits being ascribed to: 1. Direct specific action; 2. Stimulation of the blood lipases; 3. A secondary active immunization from an enhanced antigenic power of the bacilli, which still retain their fatty-waxy covering.

The second part of the paper is purely botanical. There are sketchy notes on the Natural Order Flacourtiaceae, and a list of the members of the allied forms and species in the group.

H. H. S.

RANGEL (Mario). O tratamento da lepra pelas injecções endovenosas de "Antileprol" no Hospital S. Sebastião. [**The Treatment of Leprosy by Intravenous Antileprol.**]—*Rev. Med.-Cirurg. do Brasil.* 1926. July. Vol. 34. No. 7. pp. 295–297.

This paper recounts briefly the effects of antileprol injected intravenously in three patients. In one case daily injections were attempted, but the reaction produced was too great. Bi-weekly injections proved best. The dose varied from 0·5 cc. to 1·5 cc. Within 5 minutes of injection of the smaller dose there was an attack of coughing, lasting for 5–20 minutes; after the larger doses similar coughing with considerable dyspnoea, lasting for 1–2 hours, but readily assuaged by a recumbent posture. In 8–12 hours there was a slight rise of temperature, not exceeding 38°·5 C.

The improvement in 2 patients with mixed leprosy was striking; the nodules diminished in size, the anaesthesia was less marked, the colour of the macules improved and, very noticeable, there was an increased sense of well-being. As the author states, this form of treatment has been employed only during the last six months—too short a time for any definite conclusions to be drawn.

H. H. S.

RANGEL (Mario). A lepra e seu tratamento no hospital São Sebastião. [**The Treatment of Leprosy in the Hospital of São Sebastião.**]—*Rev. Med.-Cirurg. do Brasil.* 1926. Sept. Vol. 34. No. 9. pp. 383–387.

The hospital of São Sebastião was opened for the reception of lepers in 1920, and since then 258 patients have been under treatment, 155 males and 103 females. Four preparations have been employed, namely, chaulmoogrol (the ethyl-esters of the chaulmoogra acids in camphorated oil); chaulmoogra oil prepared in the Oswaldo Cruz Institute (the ethyl-esters of the fatty acids in olive oil); antileprol from Bayer's laboratory (the same but in a very thin oil for intravenous injection); and antilebrina (an Italian preparation containing 75 per cent. of the ethyl-esters of chaulmoogra oil, 20 per cent. cod-liver oil, and 5 per cent. thymol).

The first of these was given to 57 patients and the conclusions reached are that it is efficacious in all forms of the disease, is rapid in action and brings about regression of the local conditions with disappearance of the bacilli from the nasal mucosa. The second caused violent reactions, both local and general, necessitating intermission in treatment, but in those who were able to tolerate it there was definite improvement, though less than with chaulmoogrol. The third was given in doses of 0·4 cc. at the start rising to a maximum of 1·5 cc. Paroxysms of coughing lasting for 5–30 minutes followed immediately and a slight elevation of temperature 6–8 hours later, but there were no serious effects. After 30–40 injections in the course of 3–4 months, there was distinct improvement in the general state, even though the local manifestations remained unchanged. The fourth, antilebrina, yielded results equally as good as those obtained with chaulmoogrol. About 100 patients have been treated with this, and it is hoped that a continuation of the injections may result in definite cure.

Other preparations such as karpotran, carpotrochate of copper, colloidal morrhuate of copper, eparseno, thymol, and eucalyptus have also been tried, but in too few cases or for too short a period for any decision to be reached.

Vaccine therapy, by means of various strains of acid-fast bacilli and their autolysed extracts, has been tried in 15 cases with considerable amelioration in two-thirds of them ; nodules diminished in size, ulcers cicatrized, maculae disappeared and the general state improved. In the remainder there was an appreciable effect.

H. H. S.

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IISAKA (K). Studies on the Number of Lepers in Okinawa Prefecture.—*Jl. Pub. Health Assoc. Japan.* 1926. Aug. Vol. 2. No. 8. [In Japanese.]

PALDROCK (A.). Die Lepra ist heilbar.—*Dermat. Woch.* 1926. May 1. Vol. 82. No. 18. pp. 597–605. [11 refs.]

# RABIES: A REVIEW OF RECENT ARTICLES. VI.*

*i. The Virus.* Reports continue to be published regarding the properties of the strains of fixed virus in use at various Pasteur Institutes. PALAVANDOFF and WEINBERG[1] write that the Odessa virus (*ex* Paris) gives symptoms of rabies in rabbits on the 6th or 7th days. Medullas dried at 8 to 10° C. remain fully virulent for one day, and become absolutely avirulent on the 13th day. They have found that a 1-10 emulsion of medulla kills 77 per cent. of mice when injected subcutaneously in a dose of 0·5 cc. per 20 gm. of mouse; that guinea-pigs and rabbits are refractory to subcutaneous dosage; but that with intramuscular injection the virus of Odessa kills guineapigs and rabbits in 100 per cent. of cases.

ISABOLINSKY and ZEITLINA[2] report on the virus in use at Smolensk. At this institute the virus used for case treatment is kept in 80 per cent. glycerine. It maintains its virulence in this vehicle for not longer than 15 days, and in olive oil for not more than a week.

PLANTUREUX[3] gives a further description of the properties of the Algerian strain (see also this *Bulletin*, Vol. 23, p. 693), which is now in its 1,550th passage. This virus was compared experimentally with a young strain in its 90th passage, and it was found that, if anything, the immunizing properties of the old virus were better than those of the young.

MARIE[4] has examined the original Paris strain which has been in use over a period of thirty years. He has found that a 6-day dried cord is just as virulent, when injected intracerebally into guineapigs, as it was thirty years ago. He adds that the length of the incubation period is not altered by desiccation.

It would thus appear that, in institutes where a well controlled system of subpassaging is employed, there is little risk of deterioration with continued subpassage. It should be remembered, however, that in institutes where the system of treatment employed does not necessitate the use of so many rabbits as does the dried cord method, it may not be so easy to control the system of subpassaging.

TAKAYA[5] has investigated the effects of ultra violet rays on both fixed and street virus. Radiation was employed in some instances for 30 minutes, and in others for 60 minutes, and at distances of 30 and 60 cm.

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* For the fifth of this series see Vol. 23, pp. 689-699.

[1] PALAVANDOFF (G. B.) & WEINBERG (B. G.). [Des propriétés biologiques du virus rabique fixe d'Odessa.]—*La Médecine Prophylactique.* 1926. July-Aug. Nos. 7 & 8. p. 40. [Summarized in *Bull. Inst. Pasteur.* 1926. Oct. 31. Vol. 24. No. 20. p. 912.]

[2] ISABOLINSKY (M.) & ZEITLINA (A.). Zur Frage ueber die biologischen Eigenschaften des Virus fixe.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Nov. 8. Vol. 49. No. 1-2. pp. 67-73.

[3] PLANTUREUX (Edm.). Le virus rabique fixe d'Alger, au 1.550e passage, n'a rien perdu de son pouvoir immunisant contre le virus des rues.—*C.R. Soc. Biol.* 1926. June 25. Vol. 95. No. 22. pp. 192-194. [2 refs.]

[4] MARIE (A. C.). Virulence des moelles utilisées pour les vaccinations antirabiques.—*C.R. Soc. Biol.* 1926. Nov. 19. Vol. 95. No. 33. pp. 1194-1195. [1 ref.]

[5] TAKAYA (K.). Experimental Studies on Rabies (Hydrophobia). The Influence of Ultraviolet-Rays on the Virus of Rabies.—*Oriental Jl. Dis. Infants.* 1926. Oct. Vol. 1. No. 4. English summary pp. 103-104. [In Japanese.]

The virus so treated was then injected into the subarachnoid space "by Dr. Yamaoka's method." Both street and fixed viruses were weakened by the exposure, and when the intensity of the rays was strengthened the virus was killed altogether. Fixed virus was more resistant than street.

*ii. Symptoms and Course.*—CECCHERELLI[6] after collating cases of long incubation period from the literature, describes a case in which the incubation period lasted for 8 months and 20 days. A large rabid wolf hound bit 5 or 6 dogs, numerous ducks, a sheep and a goat. The ducks died within 3 to 10 days, the dogs within a month; the sheep developed symptoms after a month and was shot; the goat died of rabies after the specified interval. It had not been bitten by any other animal during the interval. Its brain was proved to contain the virus by animal experiment. Negri bodies were present in the hippocampus.

JONNESCO[7] describes two cases of pseudo-rabies in man.

PERGHER[8] discusses the questions of congenital transmission of rabies, and recurrent rabies. The article is a summary of results collected from the literature. He lays stress on the view that in recurrent rabies the animal may be infective for many weeks or months prior to its death, and advises that the history and circumstances of the case must be taken into account before a diagnosis of rabies is excluded.

BABES and BOBES[9] contribute a long article on premonitory and periodic fever in rabies. After laying stress on the occurrence of a low degree of fever in the premonitory stages they pass on to the infectivity of the animal at this period. Three cases are described in which the animal was proved to be infective. The first—that of a cat—was one of remittent rabies. During the interval of 10 days between the attacks the animal was apparently healthy and was returned to its owner. It died in its second attack, and its brain was infective to a rabbit. The second—a dog—also a case of remittent rabies, after an attack in which it bit a number of persons and dogs, experienced an intermission 25 days, and was killed during the second attack. One person, bitten during the first attack, whose treatment had been discontinued, developed rabies on the 25th day after the bite. The third—another cat—showed a 12 days intermission. A number of persons were bitten during each attack. The treatment of the first group, which had been discontinued during the intermission, was recommenced. The authors conclude that treatment should be given in such cases even though the biting animal may apparently recover.

*iii. Pathology and Serology.*—A group of three papers in *Virchow's Archives* deals with pathological changes found in the nervous system in cases of rabies. In the first SLOTWER[10] finds evidences of changes probably of toxic origin in the midbrain. These are probably specific though this is not yet certain. These changes are of two types, viz.: collections of neuroglial cells, and accumulations of lymphocytes chiefly round the vessels. They vary in degree in the same nucleus in different cases, and in different nuclei in the same case. In six cases the substantia nigra was affected, in 5 the "supraoptic" nucleus, in 6 the paraventricular nucleus, in 3 the grisea centralis and in 3 the corpus luysii. In the second CHACHINA[11] describes similar inflammatory changes in the sympathetic ganglia. Those of the neck and trunk are most affected, and of the solar plexus to a lesser degree. The degree of the changes observed is not related to the duration of the illness, nor to the length of the incubation period. These changes cannot be considered as diagnostic of rabies. KRINITZKY[12] in a third paper finds similar changes in the subcortical ganglia, in Ammon's horn, and in the small brain. In all parts neuronophagia is apparent, especially in the horn of Ammon. He considers infiltration of vessel walls with round cells, accumulations of cells especially in the neighbourhood of the ependyma, and a sharply defined degenerative change of the nerve cells, to be specific of rabies.

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[6] CECCHERELLI (Riccardo). Incubazione lenta della rabbia.—*Clin. Vet.* 1926. Nov. Vol. 49. No. 11. pp. 719–722.

[7] JONNESCO (Démètre). Pseudo-rage chez l'homme: diagnostic et traitement. —*Presse Méd.* 1926. Nov. 6. Vol. 34. No. 89. pp. 1397–1398. [11 refs.]

[8] PERGHER (Giuseppe). Modi eccezionali trasmissione della rabbia.—*Ann. d'Igiene.* 1926. June. Vol. 36. No. 6. pp. 447–461. [64 refs.]

[9] BABES (V.) & BOBES (S.). Bemerkungen ueber das prämonitorische und das periodische Fieber bei Lyssa sowie ueber die Bedeutung der prämonitorischen Anfälle für die menschliche Wut.—*Cent. f. Bakt.* I. Abt. Orig. 1926. July 6. Vol. 99. No. 1–3. pp. 110–115. [9 refs.]

[10] SLOTWER (B. S.). Pathologisch-anatomische Veränderungen im Zwischenhirne bei der Lyssa.—*Virchows Arch. f. path. Anat.* 1926. Sept. 30. Vol. 261. No. 3. pp. 787–794. With 5 text figs. [11 refs.]

STICCO[13] has examined the urine of 123 rabbits which had died of fixed virus rabies. In 121 of these albumen was present (99·18 per cent.). In 51 sugar was found. Sugar was also present in a case of street virus rabies, whilst the reaction was negative in nine normal animals.

DA SILVA[14] has obtained negative results from experiments devised to show the presence of rabicidal substances in nerve cells. A rabbit which had received a 15 days' treatment with etherized fixed virus was killed by bleeding, one month after its last injection. Its brain was emulsified in saline, filtered, and mixed with varying proportions of a 1-100 emulsion of fixed virus brain. The mixture was tested for virulence on 12 rabbits with negative results. The serum of the same rabbit, however, was rabicidal. In a further communication[15] DA SILVA describes two cases. In the first rabicidal substances were demonstrable in the blood, 15 days after completion of treatment. In the second no substances were found 31 days after the bite. The latter case died of rabies shortly afterwards.

By means of cooked antigens and glycerine extracts of rabies brain, KRAUS and MICHALKA[16] have obtained as specific complement fixation as has been obtained in the case of other filtrable viruses. Following the technique of TAKAKI, BORIS and KOREF, KRAUS and TAKAKI (*Med. Klinik.* 1925, *Wien. Klin. Woch.* 1926), they used a cooked antigen prepared as follows. Pieces of brain are placed in 50 per cent. glycerine, and an emulsion is made with ten times the quantity of normal saline. The emulsion is cooked in a water bath for half an hour, and placed in the ice chest for 12 to 14 hours. The suspension is then strongly centrifuged and the opalescent supernatant fluid decanted. The antigen must be freshly prepared. Three doses of antigen are used (0·05, 0·02, and 0·01 cc.) against three doses of inactivated serum (0·1, 0·05, and 0·025 cc.). Each test is made up to 0·25 cc. with normal saline. One quarter of a cc. of 1-10 complement is added, and the mixture kept at 37° C. for one hour. Thereafter, 0·5 cc. sheep cells (5 per cent.), sensitized with 2 doses of immune body, are added. The first reading is made when the controls are haemolysed. The critical reading is made after 24 hours. In readings taken after 12 hours the effects of the normal constituents of the brain substance are apparent, but after 24 hours these perturbations disappear. Successful results were also obtained in further experiments in which glycerine extracts were used as antigen. Attempts were made by these means to differentiate rabies from distemper. Cooked antigens gave satisfactory results, but the authors believe that better results were obtained using the glycerinated antigen.

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[11] CHACHINA (S.). Veränderungen der sympathischen Ganglien bei Tollwut.—*Virchows Arch. f. path. Anat.* 1926. Sept. 30. Vol. 261. No. 3. pp. 795–801. With 5 text figs.

[12] KRINITZKY (Sch. I.). Veränderungen im zentralen Nervensystem bei Tollwut.—*Virchows Arch. f. path. Anat.* 1926. Sept. 30. Vol. 261. No. 3. pp. 802–820. With 14 text figs.

[13] STICCO (Emilio). Ricerche urologiche nella rabbia sperimentale del coniglio.—*Clinica Vet.* 1926. June. Vol. 49. No. 6. pp. 345–359. [24 refs.]

[14] da SILVA (E. Pereira). Sang et cellule nerveuse dans l'immunisation antirabique.—*C.R. Soc. Biol.* 1926. Nov. 26. Vol. 95. No. 34. pp. 1287–1288.

[15] da SILVA (E. Pereira). Substances rabicides du sang et immunisation antirabique.—*C.R. Soc. Biol.* 1926. Nov. 26. Vol. 95. No. 34. pp. 1289–1290.

[16] KRAUS (R.) & MICHALKA (J.). Die Diagnose des Lyssavirus mittels Komplementablenkung mit Koktoimmunogen und Glyzerinextrakt. II. Mitteilung.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. June 28. Vol. 47. No. 6. pp. 504–519. [8 refs.]

BIGLIERI and VILLEGAS[17] have found that immunity against rabies is not necessarily a blood immunity. Sometimes a solid immunity is observed with no antibodies in the blood, and *vice versa.* The spleen, kidney and suprarenals of immunized animals are definitely rabicidal. They find that intradermal inoculation treatment is more effective than subcutaneous. They do not recommend this as a method for human treatment, if the vaccinal material is living. Following the ideas of BESREDKA they have treated animals by injecting directly into the nervous tissue. The effect was a prolongation of the incubation period.

GOROVITS-VLASOVA[18] finds that antigens treated with phenol are more serviceable for the complement deviation reaction than those treated with glycerine. Using antigens prepared from brain or salivary glands of rabbits dead of rabies, they were able to detect antibodies in the blood of rabbits injected with fixed virus. When the injection was given subdurally antibodies appeared on the 5th day, and when given intravenously on the 7th to 10th day.

In the case of a woman dead of rabies GERMAN[19] has been able to demonstrate the infectivity of the blood serum. The virulence was very low. A rabbit inoculated subdurally with the blood serum developed rabies in 8 months.

*iv. Epidemiology and Control.*—In a very interesting and full paper BLANKENBURG[20] discusses the epidemiology of rabies in Germany from remote times. Full statistics are tabulated, giving the data from 1886 to date. By the aid of tables and of charts, variations from year to year are demonstrated and discussed. Other tables show the comparative prevalence in the different States and provinces, and these are contrasted and compared with the prevalence of the disease in countries which border upon Germany. He then discusses the various measures which have from time to time been adopted. It appears, according to the author, that only in England, Holland, and Germany has the great increase which followed the war been effectively combated.

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[17] BIGLIERI (R.). & VILLEGAS (C.). Immunité locale dans la rage.—*C.R. Soc. Biol.* 1926. Nov. 12. Vol. 95. No. 32. pp. 1176–1177.

[18] GOROVITS-VLASOVA (L. M.) [Deviation of Complement in Rabies.]—*Profilakticheskaya Med.* Kharkov. 1926. Apr. Vol. 5. p. 18. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Oct. 30. Vol. 87. No. 18. p. 1524.]

[19] GERMAN (O. A.). [Virulence of Blood in Rabies.]—*Profilakticheskaya Med.* Kharkov. 1926. Apr. Vol. 5. p. 14. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Oct. 30. Vol. 87. No. 18, p. 1524.]

[20] BLANKENBURG (Willi). Zur Epidemiologie und Bekämpfung der Tollwut.—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1926. Nov. 3. Vol. 55. No. 1. pp. 1–50. With 6 charts. [35 refs.]

GIESE[21] also discusses the epizootic of rabies which commenced in Germany in the early months of 1922. This reached its maximum in the summer of 1924, and then was rapidly brought under control. The author ascribes the outbreak to the breakdown of the civil authority in the countries which lay beyond the new boundaries on the eastward side of Germany.

VON OSTERTAG[22] describes the general measures which were adopted to check the inroads of the epizootic into the State of Würtemberg, and pleads for closer co-operation between the veterinary surgeon and the physician.

BARBIER[23] describes an epizootic of rabies amongst foxes in the arrondissement of Dijon. Since 1921 rabies had been continuously present amongst stray dogs. In 1925 it was realized that the source of infection might lie amongst the foxes which are prevalent in this region. In the first half of 1926 eleven carcasses of foxes were examined, and proved to be rabid. Baits containing sulphate of strychnine were thereafter laid down and by June 15th the carcasses of 119 foxes, 11 badgers, 2 wild cats and a number of stray dogs were collected. This campaign has led to satisfactory results.

*v. Canine Rabies and its Control.*—In the previous paragraph we have dealt with the general aspects of the control of epizootics; we may now pass to a larger group of communications, which deal with dog inoculation and the various methods by which dogs may be protected against the disease. LUBINSKI[24] gives a general summary of the subject and discusses the many methods which have been adopted. GIESE[21], in the paper already mentioned, after a similar résumé describes experiments devised to test the efficacies of the methods of Umeno and Doi, and of Pokschischewsky.

The former method was employed in the case of 45 dogs. Of these 33 were protected, 6 were unprotected, and of the remainder 2 died from intercurrent disease, 3 of dumb rabies and 1 of furious, before the test dose was administered. Of 21 controls, 19 died from the test dose of street virus, and 2 escaped. In a second series GIESE used Pokschischewsky's method, modified as follows. Half of the brain of a fixed virus rabbit was emulsified in 7·5 cc. of "rindfleish wasser," and a dose of 6 cc. of this emulsion, i.e., about two-fifths of a brain, was injected intraperitoneally.

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[21] GIESE (Cl.). Schutzimpfungsversuche gegen die Tollwut bei Hunden.—*Arb. a. d. Reichgsndhtsamt.* 1926. Vol. 57. pp. 410–444. With 1 chart in text. [Refs. in footnotes.]

[22] VON OSTERTAG. Die rasche Wirkung der in den neuen Normativbestimmungen festgelegten Nassnahmen zur Bekämpfung der Tollwut der Hunde. Ein Beispiel aus der letzten Tollwutverseuchung Württembergs.—*Reichs-Gesundheitsblatt.* Berlin. 1926. Mar. 3. Vol. 1. No. 9. pp. 224–227. [1 ref.]

[23] BARBIER (A.). Une epizootie de rage sur le renard.—*Rev. Gén. de Méd. Vét.* 1926. Nov. 15. Vol. 35. No. 419. pp. 609—618. [4 refs.]

[24] LUBINSKI (Herbert). Die Bekämpfung der Lyssa.—*Klin. Woch.* 1926. Nov. 19. Vol. 5. No. 47. pp. 2221-2224.

Of 9 treated dogs, 5 were protected, 3 were unprotected, and 1 died of intercurrent disease. Of 3 controls, all succumbed to the disease.

KARMANN[25] recapitulates the above experiments of GIESE, and also those of MIESSNER and BAARS, to which I referred in my former summary (this *Bulletin*, Vol. 23, p. 698). He concludes, as does LUBINSKI[24], that no sure and simple method of dog protection is as yet available.

GONSALVES[26], after the customary review, states that half a million dogs have been immunized by Umeno and Doi's method at the Institute Oswaldo Cruz, and presses for the adoption of his lipo-vaccine (to 1 to 2 gm. of titrated brain substance is added 0·5 to 1 gm. of pure lanoline—thereafter, 2·5 to 5 cc. of olive oil is thoroughly intermixed) (see also this *Bulletin*, Vol. 23, p. 696).

PLANTUREUX[27] [28] describes experiments in which vaccines containing 1/2,000 of formol were employed. This vaccine was borne without ill effect in doses varying from 10 to 80 cc. in the case of 10 rabbits and from 70 to 100 cc. in the case of 12 dogs, 10 sheep, and 4 goats. Of these 6 dogs, 6 sheep, 2 goats, and 6 rabbits resisted an intraocular injection of street virus, whilst the controls developed rabies. The doses were given in 3 to 6 injections, and it was found that the immunity was more marked with the larger number of inoculations and when the doses were spaced at relatively wide intervals. In a second experiment the vaccine was administered after the test dose had been given. Of 18 dogs which received 5 cc. of a 1-25 dilution of street virus into the muscles of the flank, 7 were kept as controls and ultimately succumbed to the disease. Of the remaining 11, which received vaccine in doses increasing from 10 to 30 cc., on four occasions at 2, 3, and 4-day intervals, only 1 developed rabies.

PUNTONI[29] [30] gives further results of his method of auto-vaccination (this *Bulletin*, Vol. 22, p. 251). He has used it with invariable success for 32 bitten animals. Of these 54 per cent. were bitten on the head, and in the case of 26 per cent. treatment was commenced in the second week. In place of 1 per cent. phenol, he now uses 1/2,000. The doses are 20 cc. for oxen and horses and 5 cc. for dogs, daily for 15 days.

FINZI[31] claims to have achieved complete success from the use of a mixed vaccine, " which is able to develop a specific homologous or heterologous immunity—fixed virus of the dog or of the rabbit—and a non-specific homologous immunity—normal nerve substance of the dog." The results of his experiments are not summarized, but are contained in a detailed table, which includes even the name and the address of the dog's owner. An analysis of this table shows that with a treatment of 3 doses given on successive days to 71 dogs, 52 remained well, 1 developed rabies, and in the case of the remaining 18 the result was for various reasons inconclusive. These statistics refer to cases in which treatment was commenced within 12 to 15 days after the bite.

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[25] KARMANN (P.). Zur Frage der Immunisierung der Hunde gegen Tollwut.—*Reichs-Gesundheitsblatt.* Berlin. 1926. Oct. 20. Vol. 1. No. 42. pp. 897–899.

[26] GONSALVES (N. Botafogo). La vaccination antirabique des chiens au moyen d'une seule inoculation.—*C.R. Soc. Biol.* 1926. Oct. 22. Vol. 95. No. 29. pp. 996–997.

[27] PLANTUREUX (Edm.). Vaccin antirabique formolé.—*C.R. Acad. Sci.* 1926. June 21. Vol. 182. No. 25. pp. 1578–80.

[28] PLANTUREUX (Edm.). Traitement antirabique des animaux par un vaccin formolé.—*Rev. Gén. de Méd. Vét.* 1926. Nov. 15. Vol. 35. No. 419. pp. 619–624. [1 ref.]

[29] PUNTONI (V.). Applicazioni pratiche dell'autovaccinazione antirabica.—*Ann. d'Igiene.* 1926. Aug. Vol. 36. No. 8. pp. 569–574. [5 refs.]

[30] PUNTONI (Vittorio). Applicazioni pratiche dell'autovaccinazione antirabica.—*Clinica Vet.* 1926. July. Vol. 49. No. 7. pp. 411–416. [6 refs.]

[31] FINZI (Guido). Studi e osservazioni sulla vaccinazione antirabica curativa dei cani.—*Clin. Vet.* 1926. Oct. Vol. 49. No. 10. pp. 609–633. [28 refs.]

*vi. Methods of Immunization.*—VOLPINO and FINOCCHIO[32] describe a method of treatment which has proved successful in 500 cases. This consists in the use of a carbolized-ether-virus. They employ ether, not so much on account of its attenuating action on the virus, but rather on account of its effect in removing toxic substances from the vaccinal material. Triturated brain substance is immersed in ether for a period of 24 to 48 hours, in the proportion of one brain and cord to 50 cc. of ether. After six hours the ether is decanted, and the sediment is again triturated with the object of freeing it from any trace of extractives. To this deposit is slowly added a half per cent. solution of phenol in the proportion of 100 cc. to each 5 gm. of nerve substance. The resulting suspension is more transparent than a fresh carbolized emulsion, and is less toxic to rabbits. In fact, whilst ½ cc. of a 5 per cent. suspension of nerve substance (phenolized 1 per cent.) kills a rabbit instantaneously when administered intravenously, it was necessary to employ 2 cc. of the carbolized ether vaccine to obtain a like effect.

PUNTONI[33] discusses the relative efficacies of the various carbolized vaccines. He claims, as a result of animal experiments, that his own mode of preparation is superior to that of SEMPLE—though the latter has the advantage of greater simplicity in preparation and in transportation. He proposes to carry out a comparative test, in which his own method will be employed in the case of patients treated at the Institute in Rome, whilst SEMPLE'S vaccine will be sent out to the provinces and employed in the case of persons bitten at a distance. He criticizes FERMI'S carbolized serum vaccine adversely.

According to DA SILVA,[34] 1,158 persons have been treated at the Lisbon institute during the year 1925 with ether virus. Only one of these developed rabies—a woman who had been bitten on the leg and foot by a cat. The method employed is rather simpler than that of ALIVISATOS and HEMPT. A daily injection of 5 cc. in the case of adults and 3 or 2 cc. in the case of infants is administered. At first 15 daily injections were given to those severely bitten, 10 in less severe, and 5 in slight cases. After the occurrence of the above mentioned fatal case, these numbers were increased to 30 and 20. Rabicidal substances have been demonstrated in the blood of 30 persons. After 9 injections it was found that a dose of 1/100 fixed virus was neutralized by an equal or double volume of the serum, after 19 injections by a double or triple volume of the serum, and that the rabicidal potency of the serum was at its maximum a few weeks after completion of treatment. In certain exceptional cases no such properties could be demonstrated. In a further paper DA SILVA[35] states that with 5 injections rabicidal activity disappears in a period of 42 days, whilst with 10 or 20 injections it may persist for 150 days.

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[32] VOLPINO (Guido) & FINOCCHIO (Marco). Studio sul vaccino antirabbico fenicato e proposta di un vaccino etero-fenicato.—*Riforma Med.* 1926. Aug. 9. Vol. 42. No. 32. pp. 748–750.

[33] PUNTONI (Vittorio). Die karbolisierten Impfstoffe gegen die Tollwut.—*Seuchenbekämpfung.* 1926. Vol. 3. No. 5-6. pp. 260–263. [2 refs.]

[34] DA SILVA (E. Pereira). Apparition précoce de substances rabicides dans le sang des individus traités par le virus rabique fixe éthérisé.—*C.R. Soc. Biol.* 1926. July 2. Vol. 95. No. 23. pp. 323–325. [5 refs.]

CUNNINGHAM, NICHOLAS AND LAHIRI[36] have carried out a careful experimental investigation of the effects of ether on the strain of fixed virus employed at Kasauli (India). They find that this strain is less resistant to the effects of ether than the strains employed by REMLINGER and ALIVISATOS. Immersion of the Kasauli strain for 84 hours apparently corresponds to immersion of the other strains for 120 hours. In the case of cords, virulence was lost after 12 hours immersion. They also found that exposure to ether vapour acted as quickly as actual immersion in the fluid. (Exposure to ether, whilst no doubt attenuating the virus in a satisfactory manner, would not of course remove the extractives.) In all 117 rabbits were employed. At the conclusion of these experiments all survivors were inoculated with fixed virus. Only one failed to develop the disease. Thus it appeared on the one hand that none of the test animals was naturally immune, and also that no immunity had developed as a result of the single dose of etherized virus which they had received.

Two authors have turned their attention to the cutaneous administration of vaccines. HALIAPINA[37] found that the application of fixed virus emulsion to the scarified surface of the abdomen of guinea-pigs invariably led to the development of rabies. The author attributes this effect to the exposure of the nerve fibrils of the *stratum germinativum*. GEORGES[38] similarly found that in the case of rabbits inoculation by friction succeeded in 50 to 98 per cent. of cases. The surviving animals were then tested for immunity by subdural inoculation of fixed virus. Of 15 of these, 10 proved to be resistant to the test dose. The author is employing cutivaccination along with the ordinary treatment in the case of persons who have been severely bitten. He has so far treated 19 persons bitten on the hand or face, and 5 bitten on the hand, by this method. One has died of rabies, the others have survived for periods of from three to seven months.

*vii. Statistics of Treatment.*—KRANZFELD[39] describes in general terms the activities of the various institutes in the Russian States. Vaccines are sent out from the Institutes at Leningrad, Moscow, Minsk, Rostov on the Don, and Odessa. Carbolized vaccines are prepared at Leningrad and Odessa, dried cords in glycerine at Rostov and Moscow, and glycerinated emulsions of fresh brain at Minsk. In the year 1925, 2,287 persons received such treatment. No numerical results are as yet available.

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[35] DA SILVA (E. Pereira). Persistance de substances rabicides dans le sang des individus traités par le virus rabique fixe éthérisé.—*C.R. Soc. Biol.* 1926. July 2. Vol. 95. No. 23. pp. 326–327.

[36] CUNNINGHAM (J.), NICHOLAS (M. J.) & LAHIRI (B. N.). An Investigation into the Value of an Etherised Vaccine in the Prophylactic Treatment of Rabies. Part I. The Action of Ether on Fixed Virus.—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 505–520. [4 refs.]

[37] HALIAPINA (K.). Rôle de la peau dans l'infection de la rage.—*Trav. Inst. Microbiol. et Hyg. d'Azerbaidjan.* Baku. 1925–26. Nos. 2–3. pp. 282–286. [In Russian.]

[38] DE GEORGES (L. V.). Essai d'immunisation locale contre la rage par la voie cutanée.—*C.R. Soc. Biol.* 1926. Nov. 5. Vol. 95. No. 31. pp. 1096–1097.

[39] KRANZFELD (A.). Die Versendung des Wutschutzimpfstoffes in der U.S.S.R. —*Seuchenbekämpfung.* 1926. Vol. 3. No. 5-6. pp. 263–264.

The number of persons treated at Tunis[40] during the year 1925 was 934; amongst these occurred 9 deaths, of which 3 were failures. Treatment is by the dried cord method, using cords which have been desiccated from 2 to 4 days.

Joannovitch[41] summarizes the statistics emanating from the institutes of Serbia and other Balkan States during the period 1920 to date. At Niche, where Högyes method is ordinarily employed, with ether virus in severe cases, 9,128 persons were treated during this period with 37 deaths and a single failure (0·012 per cent.). At Novi Sad from 1922 to the end of 1925, 8,325 persons were treated with 15 deaths and no failure. At Sarajevo amongst 1,900 persons treated there occurred 10 deaths and no failure. At these latter institutes only ether virus is now employed.

From Coonoor[42] (India) Cornwall reports that amongst 572 persons treated at the institute there occurred 7 deaths, 4 of which were failures. From this institute vaccine is also dispatched to local centres. At these 4,072 persons were treated during 1925, with 28 deaths, of which 16 were failures. From Shillong[43] we have received record of 1,176 persons treated with 11 deaths, of which 4 were failures. And from the institute at Calcutta[44], which has issued its first report, we have record of 17 deaths including 7 failures, amongst 1,461 persons treated. The statistical records of the Indian Institutes are very complete, and are worthy of imitation.

*viii. Paralytic Accidents.*—This problem, to which I have frequently referred, engages the attention of many writers. In almost every instance the whole literature bearing on the subject is surveyed, and thereafter the author draws his own conclusions. Very complete résumés will be found in the papers by Busson[45], by Mario Tinti[46], and by Lubinski[47]. The former holds that under given conditions fixed virus may become neurotropic, and so lead to paralyses. He lays stress upon the presence of fixed virus in the nervous system of persons who have died as a result of paralytic accident, and upon the constancy of the incubation period (16 days after the completion of treatment). The second argues strongly in favour of the anaphylactic origin of the neurosis. The third, in a very excellent and judicial summary, which is well worthy of study, whilst setting aside as untenable the influence of street virus, considers that experiments for and against the instrumentality of the toxins of fixed virus and of the toxic substances of normal brain material are still inconclusive. He draws attention to PAPAMARKU'S observations on the relative insusceptibility to accident of the civil as compared with the military communities in Germany and Austria during the period of the Great War. The occurrence of accidents was four times as great amongst the latter as compared with the former. Similarly, in Vienna prior to 1915, no accidents occurred amongst 6,814 cases, whilst from 1915 to 1923 there occurred 35 amongst 7,875 persons treated. Also in Java, amongst the native population only 2 accidents were reported whilst amongst Europeans there were 19, although the number of natives treated was twice as great as the number of Europeans. He also lays stress on the fact that the presence of fixed virus in the brain of a person who has succumbed from paralytic accident does not prove that the fixed virus was the cause of the condition ; and quotes a case from his own experience in which the same finding was obtained in the case of a person who died during treatment from tubercular meningitis. HERRMANN[48] covers similar ground, and ISABOLINSKY and ZEITLINA[2] state that in Smolensk. where 6,000 persons were treated with glycerinated fixed virus, no accidents occurred. PLANTUREUX[49] observed cases of cachexia in dogs which had been treated with homologous formolized virus. It is clear that until the experiments of SCHWEINBERG upon the toxicity of normal brain substance are confirmed, no conclusion can be arrived at. It is satisfactory to note that this is one of the questions which will be discussed at the forthcoming International Rabies Conference in Paris.

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[40] Archives de l'Institut Pasteur de Tunis. 1926. June. Vol. 15. No. 2. pp. 176–190. Fonctionnement des services de l'Institut Pasteur de Tunis pendant l'année 1925. [C. N.]

[41] Joannovitch (G.). Les résultats du traitement antirabique dans le royaume des Serbes, Croates et Slovènes, pendant les années 1920 à 1924.—*Bull. Office Internat. d' Hyg. Publique.* 1926. July. Vol. 18. No. 7. pp. 789–791.

[42] Coonoor, Southern India. The Pasteur Institute. The Ann. Rep. of the Director for the Year ending 28th February, 1926. [Cornwall, J. W.]—28 pp. 1926. Madras: Govt. Press. [For Official Use only.]

[43] Assam. King Edward VII Memorial Pasteur Institute and Medical Research Institute, Shillong. Ninth Ann. Rep. for Year ending 31st Dec., 1925. [Hodgson, E. C., Director.]—25 pp. 1926. Shillong: Govt. Press.

[44] Calcutta. School of Tropical Medicine and Hygiene. First Annual Report of the Pasteur Institute, Calcutta, for the Year 1924. [Fox (E. C. R.), Supt.]—pp. 3+17. 1926. Calcutta: Bengal Secretariat Book Depot.

[45] Busson (B.). Zur Frage der Aetiologie der postvaccinalen Lähmungen nach Wutschutzimpfungen.—*Cent. f. Bakt.* I. Abt. Orig. 1926. July 6. Vol. 99. No. 1-3. pp. 80–109. [4 refs.]

[46] Tinti (Mario). Paralisi acute da vaccinazione antirabica.—*Riv. di Clin. Med.* 1926. May 15. Vol. 27. No. 9. pp. 325–47. [33 refs.]

[47] Lubinski (Herbert). Zur Ätiologie der nach Schutzimpfung gegen Lyssa vorkommenden Lähmungen.—*Klin. Woch.* 1926. July 30. Vol. 5. No. 31. pp. 1419–1421.

*ix. Miscellanea.*—LOGUE and MORRISON[50] report the finding of Negri bodies in the brain of a rabbit inoculated with street virus. BOLAFFI[51] describes the technique of OSHIDA'S method of cord extraction.

BUSSON,[52] influenced by recent discoveries as to the relations which exist between filterable viruses, and to the modifications which occur in these during the course of subpassage, has examined the effect of immunization by variola vaccine upon susceptibility to rabies. His first observation was that a rabbit so treated proved to be resistant to an intracerebral dose of fixed virus. A second experiment was carried out with eight guineapigs, which were tested with street virus. All the guineapigs proved resistant, although the street virus killed 4 out of 7 rabbits which were used as controls. From these and other experiments Busson concludes that variola vaccine has the power of conferring an immunity against rabies. Whether this immunity is specific or not he is not prepared to say.

A. G. McKendrick.

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[48] HERRMANN (Otto). Die Ursachen der antirabischen Paralysen (experimentelle und klinische Beobachtungen). Mitteil. I.-III.—*Cent. f. Bakt.* I. Abt. Orig. 1926. Oct. 30; Nov. 26. Vols. 100. Nos. 4-6; 7-8. pp. 178–195 ; 320–334 ; 334–347. [Numerous refs.]

[49] PLANTUREUX (Edm.). Accidents paralytiques observés sur des animaux à la suite du traitement antirabique.—*C.R. Soc. Biol.* 1926. July 9. Vol. 95. No. 24. pp. 361–363.

[50] LOGUE (J. B.) & MORRISON, Jr. (O. B.). Rabies. With Animal Experimentation.—*U.S. Nav. Med. Bull.* 1926. Vol. 24. No. 3. pp. 574–7.

[51] BOLAFFI (Aldo). Il metodo di Oshida per la estrazione dei midolli destinati alla preparazione del vaccino antirabico (Nota di Tecnica).—*Pathologica.* 1926. Sept. 15. Vol. 18. No. 419. pp. 429–430. [2 refs.]

[52] BUSSON (Bruno). Blatternschutz- und Tollwutinfektion.—*Wien. Klin. Woch.* 1926. Oct. 7. Vol. 39. No. 41. pp. 1183–1185.

## MISCELLANEOUS.

BORCHARDT (W.). Zur normalen und pathologischen Physiologie des Schwitzens. [**Normal and Pathological Sweating.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Oct. 1. Vol. 30. No. 10. pp. 629–638. [9 refs.]

The author investigated a large number of persons living in a moist tropical climate at a temperature of 33° C. (91° F.) and found a certain percentage who had an imperfect heat-regulation; their body-temperature rising 0·3° C. (more than half a degree F.), with corresponding acceleration of the heart. The cause seems to be a scanty sweat secretion. It would therefore be wise to follow STEUDEL'S advice for people who propose to live in the tropics to have their reaction to high temperatures tested experimentally at home before deciding to reside in a hot region. The effect of heat on the tissues is regarded as direct and leading to impairment of the nervous system. The author attaches some importance to the loss of salts (especially of sodium chloride) by the sweat, and the muscular fatigue after sweating he attributes to this cause. Examination of the serum reveals there is a loss of potassium salts also. He speaks of depots in the body of Na, K, Ca and Cl, but that is a more theoretical aspect of the subject.

W. D. Halliburton.

BRAHMACHARI (Upendra Nath) & SEN (Parimal Bikash). **Researches on Blood-Sugar in Indians. Part II. Normal Renal Threshold for Sugar in Young Indians.**—*Indian Jl. Med. Res.* 1926. Apr. Vol. 13. No. 4. pp. 751–754.

The authors showed in a previous communication that in healthy young Indians (Bengalee medical students) about 10 per cent. (5 out of 47) were potential diabetics. This result was obtained by the sugar tolerance test of their blood. About the same proportion (5 out of 43) became glycosuric after a dose of 50 gm. of glucose. They continue the research in the present investigation on the normal renal threshold in 16 similar students. The glucose was given before breakfast in doses of 50 gm. or in some cases of 150 gm. or more. The result found is that the normal renal threshold is about 0·175 per cent., which is practically the same as in Europeans. In rare cases (2 out of the 16) the threshold is somewhat high, but that is also the case with healthy Europeans.

W. D. H.

CLARK (H. C.). **Some Studies of Treatment by Intravenous Injections of Mercurochrome and Neosalvarsan.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 208–212.

The Medical Staff of Almirante Hospital, Panama, presented an analytical report on 25 cases treated intravenously with mercurochrome and 26 cases with neosalvarsan, and the report is abstracted by Dr. Clark. There were 25 cases of malaria, 12 treated with one drug and 13 with the other, 14 cases of syphilis treated with neosalvarsan, 9 purulent infections and 3 pneumonias treated with mercurochrome. Notes are given on the urine, haemoglobin, erythrocytes and leucocyte counts for each disease. A summary of the conclusions is as follows: No variation of importance in the urinary findings. No change of significance in the blood. A differential leucocyte count made of 105 people in a camp of labourers in Honduras shows the wide variation in individuals considered normal. Dr. Clark suggests a similar experiment on a series of healthy cases, e.g., after accidents.

A. G. B.

McCord (J. B.). **Native Witch Doctors and Healers.**—*S. African Med. Rec.* 1926. May 8. Vol. 24. No. 9. pp. 195–205.

After giving an account of the witch doctors and healers among the Zulus and their misdeeds, the author writes:

> "What the people of Africa need is a well educated, competent medical man of their own race in each community. A native who is willing to live in a native community, and who has received a good medical education. A native who is accustomed to the native method of living and who would live among his own people on much the scale as the people themselves live. A man in their own community to visit the sick in their homes, and give them the medical attention which they should have."

A recent Commission has recommended that provision be made in South Africa for medical education for the natives, and already such a course is being given at one Native College.

A. G. B.

Trocello (E.) & Cruto (A.). **Further Researches on the Preservation of Insulin.**—*Jl. Trop. Med. & Hyg.* 1926. Jan. 1. Vol. 29. No. 1. pp. 1–2. [4 refs.]

The conclusion is as follows: "Insulin should be kept in solid form because, as shown by experiments, it does not undergo any alteration at a high temperature, and can be preserved for an unlimited length of time. The cause of the difference in preservation of insulin in liquid form lies in the fact that a hydrolysis of the product causes a deterioration in its pharmaco-dyamic properties."

A. G. B.

Chopra (R. N.), assisted by Ghosh (N. N.). **Some Medicina Plants growing in the Himalayas.**—*Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 533–537. [3 refs.]

Major Chopra, Professor of Pharmacology, Calcutta School of Tropical Medicine, and Mr. Ghosh, Research Chemist, have examined medicinal plants sent from Kashmir. Several species of *Valeriana* grow wild in the temperate Himalayas including *V. officinalis*. A specimen of *V. Wallichi* contained 0·3 per cent. of the essential oil as compared with 0·5–0·8 from the imported root, but it had not been carefully preserved. Many species of *Artemisia* grow in the Himalayas, and *A. brevifolia*, which contains santonin, fairly abundantly in parts of Kashmir. Experiments carried out at Dehra Dun show that santonin is present from the first week of July to the middle of September, i.e., from the time young flower buds make their appearance till they develop into open flowers. The maximum yields varied from 0·1 to 1·0 per cent., as compared with 1·2 to 1·4 for Russian Artemisia. The easiest and cheapest method of collection is to strip off the leaves and flower buds by hand and dry them in the sun. The plants so treated appear to be undamaged in their future growth and development, and the method entails less labour and transport than cutting. Kashmir can produce enough santonin for the whole of India and export a large surplus as well. It has been tested clinically and found just as good as, if not better than, the Russian product.

Several species of Hyoscyamus are found in India; a sample from Kashmir contained ·03 per cent. of alkaloids as compared with 0·065 in the B.P. drug. *Atropa belladonna* grows abundantly. The Kashmir roots contain 0·81 per cent. alkaloids as compared with 0·45 of the B.P. Large quantities of belladonna root are exported to Europe and returned as atropine and hyoscine. *Podophyllum emodi* is found in the Himalayas: the Indian rhizome yields 10 to 12 per cent. resin as against 4 per cent. for the American, and the resin is quite as active.

*Digitalis purpurea* is not native in the Himalayas, but is cultivated: the Kashmir leaf was found to be as good as the best available from Europe. The imported tincture soon loses a large part of its potency, so that there is advantage in using freshly made tinctures from the local product.

[The Indigenous Drugs Enquiry has already justified its existence. It is curious to read that neither santonin, belladonna nor hyoscyamus are used in Hindu medicine.]

A. G. B.

CHOPRA (R. N.) & DE (Premankur). **Indian Digitalis.**—*Indian Med. Gaz.* 1926. Mar. Vol. 61. No. 3. pp. 117–120. [3 refs.]

Most of the digitalis used in India is imported, and the loss of potency in a short time reaches 20 to 40 per cent. [see this *Bulletin*, Vol. 22, p. 993]. Hence this examination of Indian grown digitalis. It was found that digitalis of good quality grows in both Northern and Eastern Himalayas (Kashmir and Mungpoo), but the leaf of the Nilgiri Hills is, according to animal experiment, more toxic. Further clinical trials of the Mungpoo leaf are advised. Improvements are recommended in the methods of drying and storage of the native product.

A. G. B.

CHOPRA (R. N.) & DE (Premankur). **Biological Assay of Digitalis Preparations in the Tropics.**—*Indian Jl. Med. Res.* 1926. Apr. Vol. 13. No. 4. pp. 781–787.

The authors found the "frog method" of digitalis assay unsuitable for the climate of Calcutta. A modification of HATCHER and BRODY'S "cat method," consisting in studying the heart of the animal used for assay with the stethoscope, gave better results. A fair idea can be obtained of the therapeutic potency of an ordinary tincture by careful attention to four stated factors. In the case of toxic tinctures clinical tests alone give reliable information of therapeutic efficacy.

A. G. B.

Chopra (R. N.) & De (Premankur). **Variations in the Potency of Digitalis Preparations in the Tropics (II).**—*Indian Med. Gaz.* 1926. May. Vol. 61. No. 5. pp. 212—214. [6 refs.]

Messrs. Parke, Davis & Co. have recently imported to India a powerful digitalis tincture 50 per cent. stronger than that of the U.S. Pharmacopoeia ; it is called Digifortis, and can be used for 12 months. The authors have given doses up to 30 minims with satisfaction to themselves and the patients. Seven specimens of this were tested for their keeping properties, and the results are tabulated ; five kept their potency fairly well for about 12 months, and one which did not was nearly 20 months old. A practical test of activity is as follows : if when diluted with 9 parts of physiological saline or water the tincture has a light, uniformly opalescent, greenish colour, it is good ; if on dilution it is blackish and contains fine black floating particles it is probably deteriorated.

A. G. B.

Chandler (A. C.) & Chopra (R. N.). **Effects of the Administration of Sugar, Magnesium Sulphate, Sodium Citrate and Dilute Acid on the Liver Damage done by Carbon Tetrachloride.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 219–226. With 9 figs. on 3 plates. [3 refs.]

The authors' experience of the tolerance of cats for $CCl_4$ has been contrary to that of Hall and Shillinger (*J. Agr. Res.*, Vol. 23. No. 3, pp. 163–92), and they now state " that carbon tetrachloride is extremely toxic to cats, very much more so than to dogs," the liver and kidneys being severely damaged. " Practically the same results were obtained from 0·25 cc., 0·5 cc. and 4 cc. per kilo."

They studied the effects of the administration of sugar, sodium citrate, sodium bicarbonate and of purges upon the toxic effects of $CCl_4$, with the following results :—

*Sugar.*—Of doubtful value for controlling safety of administration. Avoidance of starvation and of a fat diet and encouragement of carbohydrate and protein is sufficient.

*Sodium citrate and bicarbonate.*—Given with $CCl_4$ tend to reduce amount of absorption and lessen danger.

*Purges.*—Undoubtedly helped by hastening elimination and so reducing amount of absorption.

J. F. C. H.

Lamson (Paul D.) & Wing (Raymond). **Early Cirrhosis of the Liver produced in Dogs by Carbon Tetrachloride.**—*Jl. Pharm. & Experim. Therap.* 1926. Oct. Vol. 29. No. 1. pp. 191–202. With 8 text figs. [4 refs.]

In continuation of previous experiments on dogs by the senior author and others [see this *Bulletin,* Vol. 20, p. 922 ; Vol. 21, p. 411] dogs were treated over a period of months with small and large doses of carbon tetrachloride, with alcohol, and with alcohol and tetrachloride in association. The conclusions are as follows :—

" 1. Carbon tetrachloride, in doses of 3 to 25 cc., may be given to dogs at intervals of approximately two days over a period of at least 15 weeks without loss of weight or disturbance in the apparent health of the animal.

" 2. The therapeutic dose of carbon tetrachloride (3 cc.) may also be given with large doses of alcohol (25 cc. of 50 per cent. alcohol) at intervals of approximately two days over a period of at least 15 weeks with no loss of weight or disturbance in the apparent health of the animal.

" 3. The continued administration of carbon tetrachloride alone, in small or large doses, or given together with alcohol, produces lesions, all of which are of the same type and of approximately the same severity.

" 4. The lesions found are those of early cirrhosis of the liver, and it is believed from their appearance that a more prolonged treatment with this drug will produce a true Laennec cirrhosis with circulatory obstruction."

A. G. B.

DUYCK. Un cas de stomatite ulcero-membraneuse consecutive à un traitement bismuthique. [**A Case of Ulcero-membranous Stomatitis following Bismuth Treatment.**]—*Bull. Méd. du Katanga.* 1926. Aug. Vol. 3. No. 3. pp. 100–102.

A native was admitted to hospital with symptoms of tick fever; spirochaetes were found in his blood. He received in 30 days seven injections of neosalvarsan, a total of 4·05 gm., but relapses occurred at intervals of nine days, and four other patients treated about the same time behaved similarly. Each then received an injection of 2 cc. of bismuthyl every four days without effect on the disease, and after the fifth dose a return was made to neosalvarsan. Ten days after the last bismuth injection the first patient's submaxillary glands were noticed to be swollen, a bluish line was present on the gums and an ulcer on the mucous surface of the cheek. Treatment was by intravenous neosalvarsan and a wash of hydrogen peroxide. The ulceration extended with spread of oedema till it was difficult to feed him, but after ten days he began to amend, and eventually the mouth was almost recovered, though his general condition was bad. The author draws attention to the severity of the symptoms after so small a dose of bismuth (1 gm. of Bi) and notes that the other patients did not show symptoms.

A. G. B.

CHENOY (C. F.). **A Case of Death due to Bismuth Injection.**—*Indian Med. Gaz.* 1926. May. Vol. 61. No. 5. p. 234.

Death following upon symptoms of palpitation, thoracic pain, marked dyspnoea, sweating, weak rapid pulse and respiration, cramps and paresis of legs, occurred two hours after an intragluteal injection of neo-trepol. The author surmises that the drug was given into a vein instead of into the muscle. [No mention is made of the disease from which the patient was suffering.]

H. S. S.

MAY (Etienne). Un cas de mort par le tréparsol. [**Case of Death caused by Treparsol.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. July 8. Year 42. 3rd Ser. Vol. 50. No. 24. pp. 1176–1178.

A woman, aged 43, in early pregnancy, having had two miscarriages, though there was no sign of syphilis and both she and her husband had a negative W.R., was advised by a specialist to take treparsol. The prescription enjoined daily doses for four days, beginning with one tablet and ending with four, ten in all or 2·5 gm. On the third day there was complaint of stomach ache and colic ; on the fifth day these symptoms increased : on the sixth there was vomiting with streaks of blood and in the evening hemiplegia and loss of consciousness, vomiting of black blood, and death 12 hours later.

The author believes that this is the first published case of death from treparsol poisoning, though larger doses have been frequently given. He thinks that one should always begin with small doses, not inceasing them, at least in the first course. The patient should be under medical supervision, just as in the case of arsenicals given with the needle, and the treatment broken off at the first sign of intolerance. Lastly, since there is a risk in antisyphilitic treatment it should not be advised without sufficient reasons.

A. G. B.

GUPTA (Tara Pada Sen). **Unusual Symptoms following the Administration of Urea-Stibamine.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. p. 394.

Following an injection of 0·05 gm. of urea stibamine to a patient, aged 60, with symptoms of kala azar (aldehyde reaction positive) there was delirium, with temperature 103° F., and a sensation of something " passing under the skin of the hands, face and head." The symptoms wore off in a week and the treatment was completed, without further incident, with tartar emetic.

A. G. B.

CHATTERJEE (N.). **A Case of Severe Anaphylactic Reaction following Injection of Amino-Stiburea.**—*Indian Med. Gaz.* 1926. June. Vol. 61. No. 6. p. 284.

A lady of 18, with intermittent fever and large spleen and liver, and probably suffering from kala azar, received three injections of aminostiburea. The fourth injection, given at the author's dispensary, was followed at once by urticaria with oedema of the eyelids, and dyspnoea of such urgency that he plunged a scalpel into the trachea, while his assistant gave a hypodermic injection of pituitrin. Dr. NAPIER has seen a similar case after injection of stibosan. The editor agrees that the condition is one of anaphylaxis.

A. G. B.

DE PASCALIS (Francesco). Avvelenamento mediante semi di ricino. [**Poisoning by Castor-Oil Seeds.**]—*Policlinico.* Sez. Prat. 1926. May 17. Vol. 33. No. 20. pp. 691–692.

A girl, 17 years of age, ate three fresh seeds of the castor-oil plant and suffered for a time with symptoms of considerable severity. She was restless and drowsy, with some cyanosis, tremors, rapid shallow respirations and clammy sweats. After washing out of the stomach and administration of stimulant, caffeine and ether, recovery was fairly prompt, though nausea and loose stools continued for another 48 hours.

H. Harold Scott.

SARKAR (Sarasi Lall). **Katakar Oil Poisoning.**—*Indian Med. Gaz.* 1926. Feb. Vol. 61. No. 2. pp. 62–63.

Katakar oil is obtained from the seeds of an American weed, *Argemone mexicana* Linn., common in the district and known as the Mexican prickly poppy. The oil is used medicinally for skin diseases. Mustard oil was prepared inadvertently in an oil mill previously utilized for the preparation of katakar oil, and used for the frying of cakes for three households, consisting in all of 28 persons. All were poisoned and two died. The symptoms were vomiting and diarrhoea followed by oedema of the feet and legs. Oedema remained in some instances a month later. [The oil from the seeds of this plant is reported in LYON'S "Medical Jurisprudence" as causing vomiting and purging.]

A. G. B.

PETRAROIA (Matteo). Su di un caso letale di lupinosi nell' uomo. (Avvelenamento per ingestione di semi secchi di lupino.) [**A Fatal Case of Lupine Poisoning.**]—*Policlinico.* Sez. Prat. 1926. Sept. 27. Vol. 33. No. 39. pp. 1356–1357.

A child of 17 months was brought to the author in a state of complete unconsciousness and muscular flaccidity. In the morning it had vomited and brought up about a dozen seeds of the lupine plant. In spite of all treatment, by injected emetics, washing out, stimulation, etc., the child died on the evening of the following day, without recovering consciousness.

There are many species of Lupine; the one in common use is *L. luteus*, which is prepared for food by boiling, then placed in a bag in running water for several days. After this it is eaten with impunity. The seeds contain two alkaloids, lupinin and lupinidin, and possibly a third, lupanin, and also a glucoside. Experiments in animals—guineapigs, rabbits, sheep—show that the alkaloids have an intense depressive action on the nervous centres, producing motor paralysis and diminution of sensation and abolition of the sense of pain. The post-mortem findings in sheep are atrophy of the liver, which is yellow and soft, inflamed kidneys and casts in the urine. Haemorrhagic extravasation are present in the intestine, peritoneum, endocardium, and mediastinum, and oedema of the lungs and meninges.

In cases of chronic poisoning the liver is like that of phosphorus poisoning, with fatty degeneration of the kidneys also. The question of lupine poisoning is worthy of further study.

H. Harold Scott.

RAJAN (R. Sundara). **An Interesting Case of Narcotic Poisoning and Recovery.**—*Indian Med. Gaz.* 1926. Mar. Vol. 61. No. 3. pp. 128–129.

An Indian native took as a purgative ground roots of the blue variety of *Clitoria ternatea* (N.O. Leguminosae). After some five actions of the bowels he became unconscious, and so remained for 30 hours, in a condition as of cerebral irritation, but attending to the calls of nature. Loss of memory for the succeeding fortnight preceded his complete recovery.

A. G. B.

ONORATO (Raffaele). Le sieroreazioni diagnostiche nella sifilide e nelle malattie tropicali. [**Serum-Reactions in the Diagnosis of Syphilis and of Tropical Diseases.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1925. Jan.–Feb.–Mar.; Apr.–May–June; July–Aug.; Sept.–Oct.; Nov.–Dec. Vol. 6. Nos. 1–2–3, 4–5–6, 7–8, 9–10, & 11–12. pp. 1–11; 23–41; 55–75; 87–117; 131–166. [65 refs.]

It is impossible to abstract in the space available an article which appeared in parts in each issue of a medical journal throughout an entire year. Indications only of the subjects dealt with can be given. The author carried out examinations with some thousands of sera, comprising those from healthy individuals, and those from cases of syphilis (hereditary and acquired), of phagedaenic ulcer, yaws, malaria, leishmaniasis (cutaneous and visceral). leprosy, granuloma venereum, bronchial spirochaetosis, and other diseases. He tested these by the original Wassermann reaction and by the various modifications of, and subsequent developments from, it. Among these were the methods of MICHAELIS, PORGES and MEIER, LANDAU, and KLAUSNER. He shows by tables of comparison, as well as by discussion in the text, that none of these can really replace WASSERMANN'S own method.

He then performed similar tests with the technique of SACHS-GEORGI, MEINICKE, GATÈ and PAPACOSTAS (formol-gel) and others. The first of these was carried out simultaneously with the Wassermann reaction, on 948 sera, and it was found that there was a very close resemblance, the W.R. being slightly superior. With regard to the formol-gel test he agrees with the generality of workers in placing but little reliance upon it in syphilis. Of the Meinicke reactions he describes four, of which the third modification (known in Germany as D.M.) is considered to be a very efficient substitute for the Wassermann reaction, and the fourth, known as M.T.R. (Meinicke's Turbidity Reaction), is equally serviceable. The author discusses the method and, as far as is possible, the rationale of each, and while one cannot but admire the energy and perseverance which could undertake and carry through such a vast amount of what must have been somewhat tedious work, we think that it would be most serviceable if the whole were published in book form rather than in a series of contributions to a medical periodical.

H. H. S.

HEINEMANN (H.) & HEINEMANN (Lotte). Untersuchungen ueber den Liquor cerebrospinalis. 4. Mitteilung.* [**Examinations of the Cerebrospinal Fluid. No. 4.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Feb. 1. Vol 30. No. 2. pp. 61–72. With 2 charts in text. [1 ref.]

A further contribution from these authors on the investigation of the cerebrospinal fluid in patients in Sumatra. The tables and graphs disclosing the results of this reserach cannot be " abstracted." They employed the Gold-Sol reaction (Technik Lange-Weigelt) and the Mastix reaction as described by JACOBSTAL and KAFKA (Handbuch der Serodiagnose der Syphilis.—J. Springer, Berlin). The series studied in their paper comprised 104 Javanese and 33 Chinese cases. Their results show that a positive Wassermann C.S.F. was obtained only in

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*** Previous contributions in this series were noticed in Vol. 21, p. 612, and Vol. 23, p. 220.**

syphilis: it was not obtained in malaria. Though checked by examination of the C.S.F. of over a hundred control cases suffering from various illnesses, a non-syphilitic positive Wassermann C.S.F. was never found. They consider that examination of the C.S.F. is of the greatest value in clearing up a diagnosis where the blood test is doubtful. A positive Wassermann in the C.S.F. is of absolute value. It is more difficult to interpret the results of the colloid reaction in the C.S.F. It is known that this is not a specific reaction; and their research shows that, in the tropics, it must be interpreted with especial caution. They reserve for a future paper full discussion of the question where, in positive colloid reactions in the C.S.F., lies the borderline between normal and pathological. In their patients the colloid reaction proved to be very delicate. In sensitiveness the Gold-Sol reaction surpassed the Mastix reaction.

Thus:—

| *Javanese.* | | *Positive Gold-Sol.* | *Positive Mastix.* |
|---|---|---|---|
| Lues.—Framboesia group ... | 57 cases | 72 per cent. | 65 per cent. |
| Other diseases ... ... | 47 ,, | 74 ,, ,, | 34 ,, ,, |
| *Chinese.* | | | |
| Lues ... ... ... | 23 cases | 87 per cent. | 83 per cent. |
| Other diseases ... ... | 10 ,, | 80 ,, ,, | 40 ,, ,, |

In 70 per cent. of cases the Gold-Sol and Mastix reactions were the same—they differed in 30 per cent. of cases, and of these last ⅘ths were only Gold-Sol positive, ⅕th only Mastix positive. When the Gold-Sol and Mastix reactions differed, malaria was often the cause. While in malaria some ⅘ths of the cases show a Gold-Sol reaction, only ⅓rd give a positive Mastix reaction. In yaws, ¼th give only Gold-Sol positive reaction and ⅔rds a positive Mastix reaction. The significance of these differing reactions will be discussed in a future paper.

H. M. H.

CASTELLANI (Aldo). **Observations on the Importance of Symbiosis or Close Association of Different Species of Organisms in the Production of certain Biochemical Phenomena and in the Causation of certain Diseases and certain Symptoms of Disease.**—*Jl. Trop. Med. & Hyg.* 1926. Aug. 2. Vol. 29. No. 15. pp. 217–226. With 5 text figs. [10 refs.]

In this article the author illustrates and extends his views upon the effects produced by micro-organisms in symbiosis or close association, [see this *Bulletin*, Vol. 23, p. 214, CASTELLANI; p. 632, FIALLOS]. Numerous examples of these associations are given, with details. Thus *B. typhosus* forms acid only, never gas, from maltose, mannite, and sorbite, while *B. proteus* has no action on these substances, but their mixture produces both acidity and gas. Two organisms, *B. vermiculoides* and *Cryptococcus graciloides*, isolated from cases of stomatitis (Vol. 23, p. 438) slowly give rise together to gas formation from glucose, levulose and maltose, but do not do so individually. Baker's yeast taken as a whole ferments, with the production of gas, more carbohydrates than any of the single organisms isolated from it. The reverse phenomenon—that is to say, inhibition of gas formation by organisms when grown in association—has also been observed. *Monilia tropicalis* produces gas from saccharose, while *B. typhosus* does not; if the former be grown along with the latter, no fermentation of the saccharose occurs.

The author lays stress in this paper on the importance of symbiosis or close association of organisms in the aetiology of certain diseases. Three examples are given of diseases in which symbiosis or close association of two organisms is apparently the true cause. The diseases are not important except from the scientific standpoint. They are: (1) *Trichomycosis nigra*, a disease of the hair due to organisms named *Nocardia tenuis* and *Micrococcus nigrescens*; (2) *Trichomycosis rubra*; (3) *Stomatitis Cryptococco-bacillaris*, the lesions of which are quite different in appearance from thrush. Symbiosis of organisms, where the term symbiosis is used in a broad sense, occurs in a number of affections. The pustular eruptions in scabies, copra itch and yaws are due to pyogenic cocci. Meteorism in typhoid fever may possibly be due to association of *B. typhosus* and *B. morgani*, neither of which alone produces gas. Favus is accompanied by a mousy smell, which it would appear is not due to the fungus directly but to associated bacteria. Thus, it is contended that "certain so-called typical symptoms of diseases of which we know the specific organisms are in all probability due, not to the specific germ alone, but to the association of the specific germ plus one or more non-specific organisms."

W. F. Harvey.

SAVATEEF (A.). Contribution à l'étude de la pathologie des animaux de laboratoire. [**Pathology of Laboratory Animals.**]—*Russian Jl. Trop. Med.* 1926. No. 2. French summary pp. 56–57. [In Russian.]

The diseases which spontaneously occur in rabbits are enumerated, in so far as they were observed in 1,641 autopsies. These affections are found in relation to the skin; the nervous system; heart, lungs, pleura, and respiratory passages; peritoneum, small and large intestine, mesenteric glands, liver, spleen and kidney, suprarenal, thyroid and thymus glands.

W. F. H.

BAIXE (A.). Le séro-diagnostic sans laboratoire. [**Serum Diagnosis without Laboratory.**]—*Arch. Méd. et Pharm. Nav.* 1926. Apr.–May–June. Vol. 116. No. 2. pp. 120–131.

The serum-diagnosis referred to is that of macroscopic agglutination and intended to be used by clinicians, especially maritime and colonial medical officers. It is important that the strain used for the suspension be easily agglutinable and *B. paratyphosus A* is the organism to which this remark particularly applies. The suspension recommended is one of a 24-hour agar growth of bacteria in 0·77 per cent. sod. fluoride. It should not be too concentrated; 800 million organisms per cc. is sufficient to give clear-cut results. These suspensions are put up in sealed tubes, kept at 40° C. for 48 hours, and are utilizable over a period of years if necessary.

W. F. H.

REITER (Hans). Versuche ueber perorale Immunisierung. [**Oral Immunization.**]—*Deut. Med. Woch.* 1926. June 4. Vol. 52. No. 23. pp. 946–949.

The author points out in the text that his experiments, so far as they go, do not present very clear results for the action of sodium benzoate in promoting the immunizing power of vaccines given *per os.* Its action, however, is considered to be similar to that of bile and salts of bile acids in producing an increase of the permeability of the gastro-intestinal wall. His conclusions are :—

1. Successful immunization *per os* can be attained in animals against typhoid, dysentery and other organisms.
2. Oral administration of a dose of 5 to 10 per cent. sodium benzoate 1 to 3 hours previous to a vaccine, preferably on an empty stomach, can increase permeability. In the trials made, acceleration of immunizing action was to some extent counterbalanced by an action destructive to the immunizing power of the vaccine.
3. The special part played by the mucous membrane of the gut in the production of protective substances is undecided. The immunity developed through oral administration is not merely a local one, but is general.
4. The degree to which the results of experiment are applicable to man must be tried out on human beings.

W. F. H.

ALESSANDRINI (A.) & SETTE (N.). Conservazione quadriennale in sangue di coniglio del virus di Danysz allo stato di virulenza. [**Maintenance of the Virulence of Danysz Virus for Four Years in Rabbits' Blood.**]—*Ann. d'Igiene.* 1926. June. Vol. 36. No. 6. pp. 433–440. [19 refs.]

By passage through mice, first by intraperitoneal, then by subcutaneous injection of the organism, and finally *per os* mixed with grain, a degree of virulence is obtained such as will kill a rabbit in 4–6 days after intravenous inoculation. Ten hours after inoculation a vein is opened, the blood obtained is defibrinated, placed in a thermostat at 37° C., and then tubed and sealed. Some virus which had been thus kept for as long as four years was found to have retained its virulence ; mice fed with an 18-hour agar culture from this, mixed with grain, died in 4–6 days ; one-thirtieth of an ordinary loopful inoculated subcutaneously killed in 12–24 hours and the same amount intraperitoneally in 20 hours. When deposited on the conjunctiva death resulted in 6–8 days. In all cases the post-mortem findings were those produced by the bacillus in the intestine, liver and spleen.

The maintenance of virulence is ascribed to two facts : First, that there is very little oxygen present, and, secondly, that the pabulum is a favourable one and of constant composition.

H. Harold Scott.

RÉGNIER (Robert) & PUSSARD (Roger). Des conditions dans lesquelles se propage la maladie communiquée aux campagnols par le virus de Danysz. [**Conditions of Transmission of an Epidemic by Danysz Virus to Field Mice.**]—*C. R. Acad. Sci.* 1926. Aug. 23. Vol. 183. No. 8. pp. 451–452.

Stress is laid upon the necessity of dealing with a plague of field mice by an extensive campaign. It is not sufficient to infect a few individuals with Danysz virus to bring about the desired general epizootic. From September to January the field mice congregate in their nests. Infected animals die in their nests and the galleries, and serve, through faecal contamination or perhaps parasites such as fleas, to transmit the disease to others. They also devour one another and infection is brought about in this way. But this is all a somewhat accidental mode of transmission of the disease, and not sufficiently certain. To be effective infection must be distributed throughout the whole invaded area and its surroundings, while supplementary treatment with gas, poisoned baits and repetition of infection is also required.

W. F. Harvey.

MEYER (K. F.) & BATCHELDER (A.). **Local Immunization of Guinea Pigs to Cutaneous Infection with a Pasteurella isolated from Wild Rats.**—*Proc. Soc. Experim. Biol. & Med.* 1926. May. Vol. 23, No. 8. pp. 730–734. [3 refs.]

A pasteurella infection of wild rats had been found, which caused confusion in the rapid diagnosis of chronic rodent plague. Like its congener *B. pestis*, this organism caused the death of guineapigs when tissues containing it were rubbed into carefully shaven skin. This skin test is one of the most delicate and rapid methods of recognition of infected plague material. Three experiments were instituted which had for their object the proof of what is given as the title of this preliminary communication. These experiments were :—

1. The filtrate through a Berkefeld V candle, obtained from 18-day shallow cultures at 28° C. of virulent strains of the rat pasteurella, was itself lethal to guineapigs in intracutaneous doses of 0·5 cc. When this filtrate was sown with pasteurella it proved inhibitory to further growth ; that is, it apparently contained " anti-virus " of Besredka. The medium of growth was beef heart-hormone broth of pH7·0.

2. A filtrate similar to that in the first experiment was prepared but from growths in deep culture. It was not inhibitory to further growth of the pasteurella and therefore contained no " anti-virus." Neither did the filtrate show toxic effect on intracutaneous inoculation of 0·3 cc., nor were the inoculated guineapigs in any way immune to subsequent test by rubbing of virulent spleen material into the slightly scarified skin.

3. The same method of preparation of filtrate was employed as in No. 1, but the incubation of cultures was for seven days only. This filtrate contained " anti-virus " and was inoculated intracutaneously in doses of 0·3 cc. The tests, for which also proper controls were used, consisted in the application at intervals of 18, 24, 48, 72 hours and 5 and 8 days of crushed spleen fragments of an infected guineapig either on the mucous membrane of the nose, to the slightly scarified skin, or in a subcutaneous pocket. Complete protection to the surface infection manifested itself in these guineapigs, but not to the subcutaneous infection.

The authors conclude that in guineapigs they have " established the possibility of protecting the entire integumentum inside of 18 hours, but not the subcutaneous tissues, when non-toxic filtrates prepared from seven days old cultures grown in shallow layers, containing a growth inhibiting substance or antivirus, are inoculated intracutaneously."

W. F. H.

OTTEN (L.). Die Differentialdiagnose zwischen den Erregern der hämorrhagischen Septikämien. (*Bac. pestis, Pseudotuberculosis rodentium* und *Plurisepticus.*) [**Differentiation of the Organisms of Haemorrhagic Septicaemias.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. June 7. Vol. 98. No. 7–8. pp. 484–492. With 2 folding plates. [17 refs.]

Under the designation organisms of the haemorrhagic septicaemia group are included many ill-described species or subgroups of bacteria.

The existing descriptions too are often contradictory. The particular bacteria specifically known as *B. pestis*, *B. pseudotuberculosis rodentium*, and *B. pluriseptícus* are investigated for differential characters, apart from their clinical manifestations or the particular animal in which they commonly produce disease. It is very desirable that these organisms, which give rise in nature to disease in animals and so may cause confusion in animal tests for the recognition of the bacillus of plague, should be specifically separated. The strains tested were six of each of the organisms and the character investigated was the hydrogen-ion concentration produced after 1, 3, and 7 days in 0·5 per cent. peptone water containing 0·5, 0·25, 0·1 and 0·05 per cent. glucose respectively. A definite measurable colour reaction was obtained in this medium, with litmus as indicator, and this was consistently distinctive for each of the test organisms: thus, for example, the pH readings after three days' growth in 0·05 per cent. glucose peptone water were 5·0–5·4, 6·3–6·7 and 5·8–6·2 for *B. pestis*, *B. pseudotuberculosis rodentium* and *B. pluriseptícus* respectively.

W. F. H.

NICOLLE (Charles) & LUMBROSO (Ugo). Recherches sur les conjonctivites granuleuses naturelles de quelques animaux de laboratoire, en particulier du lapin. Leur importance dans l'étude experimentale du trachome humain. [**Granular Conjunctivites of Laboratory Animals. Importance for the Study of Trachoma.**]—*Arch. Inst. Pasteur de Tunis.* 1926. Sept. Vol. 15. No. 3. pp. 240–266. [1 ref.]

Previous work had shown the possibility of inoculation of human trachoma virus on the rabbit's conjunctiva. But very considerable doubt is now raised by the authors as to the validity of this transmission. The reason for their new point of view is that the rabbits of Tunis are almost universally affected by lesions which take the form of areas of granulation or isolated granules. These had formerly been taken to be normal histological appearances but are now shown to be granulations, especially liable to be stimulated into activity by scarification of the conjunctiva. They are inoculable from rabbit to rabbit and from rabbit to the conjunctiva of monkeys; special care has to be taken to ensure the freedom of the monkey itself from similar granulations, because it also suffers from this condition. And thus the conclusion is reached that inoculation of human trachomatous virus to the rabbit does not give rise to any specific lesion but to lesions similar to those which are produced by the natural granulation virus of the rabbit. It is therefore impossible to know, by the results obtained, whether human trachoma virus has really ever developed on the conjunctiva of the rabbit. Some facts seem to indicate that the rabbit virus is derived from the soil.

W. F. H.

DURAND (Paul) & LUMBROSO (Ugo). Recherches sur le bacille de Weeks. [**Bacillus of Weeks.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 71–92.

This is a study in some detail. As criterion the authors have taken: Conjunctival origin; a long rather slender bacillus, sometimes coccobacillary; Gram-negative; growing freely on media containing heated blood or blood extracts, less freely on media containing unheated blood, and not at all on ordinary media. Other characters investigated are habitat, fermentation of sugars, production of indol, power of reducing nitrates, haemolytic power, agglutination and saturation reactions, animal inoculation and virulence for man. The authors lay stress on their use of washed bacilli for agglutination tests and of agglutination sera obtained by immunization with single strains. Divergence of results make characterization difficult. The power of reducing nitrates and absence of haemolytic power were constant in the strains used. It was not possible to produce conjunctivitis by instillation of the bacillus in monkeys, rabbits, guineapigs, sheep, dogs, horses, etc., but in human volunteers seven positive results were obtained out of 24. A strain of the bacillus of Pfeiffer did not give conjunctivitis in man. The authors conclude that, except for its conjunctival origin and virulence, the bacillus of Weeks does not differ morphologically, culturally, biochemically or serologically from the bacillus of Pfeiffer.

W. F. H.

DURAND (P.), ANDERSON (Ch.) & LUMBROSO (Ugo). Bacille de Weeks, bacille de Pfeiffer et agglutination acide. [**Bacillus of Weeks, Bacillus of Pfeiffer, and Acid Agglutination.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 93–100. [10 refs.]

The acid solutions used were: (1) mixtures of lactic acid and sod. lactate of increasing ionization; (2) the same series diluted 1–6 with doubly distilled water, and (3) solutions of acetic acid of the same pH as the preceding. The test organisms were grown on heated blood agar, washed in distilled water, and made up in a suspension of about 2 mgms. per cc. Care was taken that the glassware used should be strictly neutral. The acid solutions were distributed in amounts of 1 cc. in test tubes and ⅓ cc. of bacterial suspension added: the agglutination results were read after 12 to 15 hours at 37° C. These results were very much the same for both the bacillus of Weeks and the bacillus of Pfeiffer with the acetic acid solutions, but significantly different in the case of the undiluted lactic acid mixtures. Thus acid agglutination proves to be the only method by which these two groups of allied organisms are distinguishable *in vitro*.

W. F. H.

DURAND (Paul). Technique de l'isolement du streptobacille de Ducrey. [**Isolation of Ducrey's Bacillus.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 118–127. [9 refs.]

The bacillus of Ducrey or streptobacillus of soft chancre is difficult to grow with certainty.

Technique.

(1) Add aseptically to 150 cc. 3 per cent. melted agar of pH7·6 at about 45° C. 30 to 50 cc. defibrinated sheep blood. (2) Mix with care and distribute in test tubes. (3) Allow the blood agar to solidify in the sloped position. (4) Cleanse the surface of the open chancre carefully with sterile gauze. (5) Apply, with some pressure, tincture of iodine for 3 or 4 seconds. (6) Remove excess of iodine with alcohol and dry with sterile gauze. (7) Squeeze the base of the chancre between finger and thumb. (8) Take up the drop of serum which gradually exudes, in a capillary pipette. (9) Sow 4 or 5 blood agar tubes in succession with this material. (10) Incubate at 37° C., or better at 35 to 36° C. (11) Examine the tubes at the end of 24

or 48 hours for very regular, lozenge-like, whitish-grey, glistening colonies of the streptobacillus among the colonies of contaminating organisms. (12) Examine microscopically and particularly for long chains of bacilli in the water of condensation. (13) Subculture on sheep, rabbit, or human blood agar.

The technique of isolation is much easier if the soft chancre be unbroken or if the material be pus from a closed bubo. The author was able to grow the organisms successfully 39 times out of 40 cases.

W. F. H.

NOGUCHI (Hideyo). **A Filter-passing Virus obtained from** *Dermacentor andersoni.*—*Jl. Experim. Med.* 1926. July 1. Vol. 44. No. 1. pp. 1–10. With 4 charts in text. [4 refs.]

The tick *Dermacentor andersoni* is concerned with the transmission of Rocky Mountain spotted fever and of tularaemia. Four out of a collection of these ticks were used in tests for spotted fever virus and two of them gave positive results. Tick No. 3 contained an unusually large number of micro-organisms very similar to those of spotted fever ticks. The injection of a suspension of the viscera of this tick, however, produced in a guineapig a fever resembling spotted fever but conferring no immunity to that disease. The virus of tick No. 3 formed the subject of experiment. It is an aerobic, invisible, filter-passing virus and has been subcultured for seven generations at 37° C. No growth occurs in ordinary broth or agar, but a slight turbidity is produced in serum media containing mixed sugars. Guineapigs which have responded to the virus cannot be re-inoculated but can still be infected with spotted fever virus, and conversely. The spleen of an infected guineapig, which is much enlarged, is infective, as is also the blood. The fever is high and continuous. No micro-organisms have been seen in the spleen or blood of the animals. Ticks can be infected with the virus by feeding on infected guineapigs, and in one case the infection was transmitted by feeding from tick to guineapig.

W. F. H.

PEYRE (Edouard). Hémoglobinimètre de Sahli modifié pour exprimer en poids l'hémoglobine contenue dans le sang. [**Haemoglobinometer graduated for Weight of Haemoglobin.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. June 10. 3rd Ser. Year 42. Vol. 50. No. 20. pp. 920–921. With 1 text fig.

The author in this short note refers to the varied readings of different haemoglobinometers according to the basis taken. Those of Sahli or of Gowers are graduated at 100 per cent. for a value of 17·20 gm. haemoglobin per 100 gm. blood, whereas the mean normal is only 13 to 15 gm. He thinks that it would be simpler to express haemoglobin value gravimetrically. In such a case, the graduations 0 to 20 of a Sahli-Gower instrument would represent grammes of haemoglobin per 100 gm. of blood, instead of a percentage of the normal content.

W. F. H.

i. KÖHLER (Günther). Zur Verbreitung des Kropfes in Ostasien. [**The Distribution of Goitre in East Asia.**]—*Muench Med. Woch.* 1926. May 7. Vol. 73. No. 19. p. 781.

ii. DATTA (J. K.). **Ear, Nose and Throat Diseases among Calcutta University Students.**—*Indian Med. Gaz.* 1926. Apr. Vol. 61. No. 4. pp. 168–173.

iii. LESNE (E.), MARQUEZY (R.) & LAMBLING (A.). Deux cas de méningococcémie prolongée à forme pseudo-palustre. Guérison après abcès térébenthiné. [**Two Cases of Prolonged Meningococcaemia simulating Malaria. Recovery after a Turpentine Abscess.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. Aug. 5. Year 42. 3rd Ser. Vol. 50. No. 28. pp. 1376–1381. With 2 text figs.

iv. PANAYOTATOU (Angélique). Herpès et rougeole en Egypte. [**Herpes and Measles in Egypt.**]—*Rev. Méd. et Hyg. Trop.* 1926. Mar.-Apr. Vol. 18. No. 2. pp. 41–44.

v. KENYA MEDICAL JOURNAL. 1926. July. Vol. 3. No. 4. p. 119. [1 ref.]—**An Antidote to Arsenic, Bismuth and Mercury Poisoning.**

vi. PRINGLE-PATTERSON (A E. S.). **Cases of Mushroom Poisoning in India.**—*Jl. Roy. Army Med. Corps.* 1926. Mar. Vol. 46. No. 3. pp. 210–211.

vii. DILLING (Walter J.). *Chlorocodon whiteii* : **its Constituents and their Pharmacological Actions.**—*Jl. Pharm. & Experim. Therap.* 1926. Jan. Vol. 26. No. 6. pp. 397–411. With 4 text figs. [5 refs.]

viii. WITTVROUWEN. Rapport sur un cas d'intoxication par médicaments indigènes (dawa). [**A Case of Poisoning by Native Medicines.**]—*Bull. Méd. du Katangà.* 1926. Feb. Vol. 3. No. 1. pp. 19–20.

ix. BAYON (H. P.). **Virus Diseases of Bacteria, Plants and Vertebrates.**—*Jl. Trop. Med. & Hyg.* 1926. Jan. 15. Vol. 29. No. 2. pp. 17–37.

x. PHILLIPS (John). **A Case of Endemic Funiculitis.**—*Indian Med. Gaz.* 1926. June. Vol. 61. No. 6. p. 287.

i. This brief article consists chiefly of extracts from geographers who have commented on the frequency of goitre in regions of Tibet, China, Shan States, etc. The regions are more or less defined, the incidences vague.

ii. A didactic article by a specialist, in which he draws attention to the neglect and ignorance of nose, throat and ear diseases in India, and the need in India for a comprehensive system of school medical examinations.

iii. The interest for us of these cases is the temperature chart, which in the first case, a child of five years, suggests quotidian fever, and in the second, a child aged two, tertian fever. Owing to the presence of other symptoms diagnosis was not difficult.

iv. Since herpes is rare in the eruptive fevers, the author records this case of measles and herpes in the same subject.

v. A reference to the use of the well-known remedy, sodium thiosulphate.

vi. Three persons were taken ill after dinner, which included unidentified mushrooms, with symptoms suggesting alcoholic poisoning ; in one case no alcohol had been taken. After an emetic recovery was rapid.

vii. The conclusion formed from an examination of the roots of *Chlorocodon whiteii*, an Asclepiadaceous plant from tropical and subtropical Africa, is that it cannot merit a place in practical therapeutics.

viii. The notes of the analysis of the tissues and vegetable substances administered show that these contained strychnine and another alkaloid, the injection of which killed a frog.

ix. This is an attempt to bring the viruses together under one general conception. Though purely speculative in purpose and method, it is extremely interesting as a historical summary of the subject.

x. A brief record of this condition in a native, with recovery without suppuration. The editor says that acute funiculitis is occasionally met with in Bengal and is not infrequently fatal.

A. G. B.

# REVIEWS AND NOTICES.

ZIEMANN (Hans) [Professor a. d. Univ., Berlin.] Hämatologisches Praktikum für Studierende und Ärzte. [**Haematological Practice for Students and Doctors.**]—pp. viii+166. With 34 figs. & 3 coloured plates. 1927. Berlin: Verlag von S. Karger, Karlstrasse 15. [M. 7.20.]

It is the avowed object of this handbook to afford the practitioner a general survey of haematology, and in small compass, its practical application to the diagnosis and treatment of disease; it therefore follows that the descriptions of the various blood elements and the methods by which they are studied are briefly and clearly set forth, while the more elementary processes, such as staining methods and the counting of the corpuscles, receive the same attention as the more highly technical investigations of the serum.

Following upon a concise account of the elements of the blood, both abnormal and normal, we are introduced to the bio-chemical aspects of haematology, many of which—as for instance, the albumin and globulin content of the plasma, are of doubtful clinical value, and have not, as yet, entered the purview of the general practitioner. The blood-forming organs, the bone-marrow, the spleen, the lymphatic system, and the embryology of the blood also receive some attention. A special section is devoted to pathological conditions of the blood, the various anaemias of infancy and adult age, and in order to economize space, the descriptions are often synoptical including short statements on diagnosis and treatment, but whether it would have been more advantageous to have entirely omitted this is certainly open to question. A feature of the latter portion of the book is a series of differential diagnostic tables of the leukaemias, purpuras and haemophilia. A more lengthy column sets forth the diagnostic significance of the differential blood count in the various blood infections known to medical science. It is, however, unwise to dogmatize too freely on the exact value of the minute changes in the character or proportions of the various leucocytes, and more especially is this true in surgical abdominal conditions. The description of the human blood parasites is disappointing and the text here is hardly illuminated by the illustrations; that of the Leishman-Donovan body and the *Spirochaeta recurrentis* could be greatly improved, while in the microfilariae details of the internal structure have been omitted. The subject-matter is thoroughly up to date. In malaria, Plasmochin receives adequate mention and its value in treatment is already assessed, though much confirmatory work still requires to be done. There is one coloured plate wherein the main blood cells are well depicted, though it must be admitted that the malaria parasites hardly attain the same high standard. To the reader unacquainted with the earlier literature of ROMANOWSKY's work, it may be a matter of comment to find this stain rechristened the Romanowsky-Ziemann method.

The criticisms which have suggested themselves to the reviewer do not detract from the value of the book, which will take a definite place in the literature of haematology; it will assuredly be found on the bookshelf of the modern medical practitioner and should materially assist him in translating into practical language such blood-examinations as he, from time to time, may wish to have carried out. Ziemann's Praktikum has therefore fulfilled its aim in an admirable manner.

P. H. Manson-Bahr.

## *Recent Monographs on Helminthology.*

BAYLIS (H. A.) [M.A., D.Sc., Brit. Museum (Nat. History)] & DAUBNEY (R.) [M.Sc., M.R.C.V.S., Vet. Res. Laboratory, Kabete, Kenya Colony.] **A Synopsis of the Families and Genera of Nematoda.**—pp. xxxvi—277. 1926. London: Printed by Order of the Trustees of the British Museum. [10s. 6d.]

STILES (C. W.) & HASSALL (Albert). **Key-Catalogue of the Worms reported for Man.**—*U.S. Public Health Service. Treasury Department. Hygienic Laboratory Bulletin No. 142.* Washington. 1926. Jan. pp. iv+69+196.

POCHE (Franz). **Das System der Platodaria.**—*Archiv. für Naturgeschichte.* 1925. 91st Year. Abt. A., Nos. 2 & 3. pp. 1–240, & 241–458. With 7 plates. 16 text-figs., & 1 geneological tree of the Digenea. [Issued in Jan. & Mar. 1926.]

MEGGITT (F. J.). [M.Sc., Ph.D., Prof. of Biology, Univ. of Rangoon.] **The Cestodes of Mammals.**—iv+282 pp. 1924. London. [Sold by Edw. Goldston, 25, Museum Street, W.C. 1. Price 6s.]

The year 1926 was remarkable in the recent history of Helminthology for the appearance of no less than three new efforts to codify the classification of parasitic worms. YORKE and MAPLESTONE, in a volume already reviewed in this *Bulletin*, Vol 23, p. 328, confined their attention to the "Nematode Parasites of Vertebrates." This, perhaps, was the most imposing and the most ambitious, although it omitted entirely the free-living forms and those parasitic forms met with in invertebrates. The various known and several new genera were classified and defined. Such species as appeared to the authors to be recognizable were listed. But no attempt was made to differentiate species save by indicating the principal hosts from which these had already been recorded.

Baylis and Daubney have produced a much less expensive, but for the medical parasitologist, in so far as it covers the same ground, a much less useful compilation. They have confined themselves to definitions of higher groups and of genera of Nematodes parasitic and free living—listing only the *type* species in each genus. To a practical worker in Helminthology, the formal definition of a genus may alone frequently be of little value; for every new species may bring about a need for the revision of previous generic concepts or necessitate the formation of a new genus. To workers in the tropics, therefore, a volume is of little help which provides, merely, the possibility of tentatively placing a specimen in a genus. It is, however, of considerable value to the systematist in museums and zoological laboratories by bringing into a single and easily accessible code the concepts of one of the leading systematists in this group of zoology.

Both these volumes acknowledge the assistance derived from the subjects' and authors' sections of the Index Catalogue of Medical and Veterinary Zoology, published by STILES and HASSALL. Indeed, to those working systematically in Helminthology, it is obvious that neither of these volumes could have been successfully compiled at the present time but for the vast mass of bibliographical information that these two American writers had accumulated.

These authors had themselves projected a systematization of their own work in the form of a Host Catalogue, and this is now appearing. Part II has been issued as the Hygienic Laboratory Bulletin No. 142 in January, 1926, and is entitled "Key-Catalogue of the Worms Reported for Man." It may be procured from the Superintendent of Documents, Government Printing Office, Washington, D.C., at a cost of 20 cents (plus postage).

Although the title of this latter publication suggests that it deals only with the parasites actually found in man, the authors have taken the opportunity to equip the reader with definitions of the higher groups, not merely of the

Nematoda, but also of the Trematoda and Cestoda; and they have (in the form of a series of footnotes which not infrequently extend over five-sixths of a page) given in abbreviated form many comprehensive keys to the families, sub-families and genera devised by previous writers. These keys extend beyond the host limitations defined in the title: and provide, in a less attractive form, the same formal kind of information as presented in the two monographs already mentioned.

The key catalogue is, further, of practical value to the field worker and to those in tropical laboratories, whose duty it may sometimes be to identify the less common parasites of man, for the definitions and differential tables extend to species and even to artefacts. The publication, however, shares with the others the defect that an untrained worker will find it extraordinarily difficult to recognize the structures so succinctly but so technically described, owing to the condensation which has necessarily resulted from an attempt to crowd into 120 pages such an enormous amount of information concerning differential diagnosis, nomenclature, vectors and reservoir hosts.

The authors state that the pamphlet has been prepared in its present style for use by the class in Medical Zoology at the Hygienic Laboratory, and it is intended to present a fairly comprehensive working reference index to the subject of Medical and Veterinary Zoology.

We cannot but admire the high standard which is now attainable in Parasitology by the personnel of the United States Public Health Service.

Those interested in the classification of Flatworms will find much cause for perturbation in a monograph "Das System der Platodaria," published in the *Archiv für Naturgeschichte* (Abteilung A) for 1925, but issued in January and March, 1926. Dr. Poche of Vienna, with Nelson gesture, sweeps a critical eye across the whole Platyhelmia creating Supersuper-families, Subtribes and Families galore which must engage the attention of all workers in helminthology for some time to come. This modern Linnaeus merely states the number of genera in the various families and leaves the unhappy reader to ascertain for himself how the number is made up.

A most useful and successful compilation and one which can be cordially commended to those concerned with the identification of tapeworms is a clearly printed and well arranged volume on "The Cestodes of Mammals," compiled by F. J. Meggitt, Ph.D., now Professor of Biology at Rangoon. This post-war contribution, which was printed abroad, and dated 1924, is now obtainable from E. Goldston, 25, Museum Street, London. Those who invested in German marks will be glad to find that one Englishman, at any rate, shrewdly turned the depreciated German currency to good and altruistic account: for the author by printing his monograph in Germany has been able to place it on the English market for the price of 6s. per copy—a cost absurdly low in comparison with English productions at the present time.

R. T. Leiper.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 4.

## MALARIA.

FAUST (Ernest Carroll). **An Inquiry into the Prevalence of Malaria in China.**—*China Med. Jl.* 1926. Oct. Vol. 40. No. 10. pp. 937–956. With 3 maps and 1 chart. [18 refs.]

Ague as reported in China dates back to 2600 B.C. Answers from 150 medical men to a questionnaire show:—

> "(1) The complete absence of the disease endemically in the northwest, outside of a line drawn through Kalgan, Central Shansi (north and south), Southern Shensi and Central Kansu (east and west); (2) the severity of the infection beginning in the lower Yangtze Valley and extending along the southeast coast, reaching its saturation point in Formosa, Hainan, and Tonkin (French Indo-China); (3) the heavy infection in southwestern Yünnan, particularly in the region adjacent to Burma; (4) the heavy infection in the upper Yangtze Valley (Min River, Central Szechuan); (5) the relatively small amount of malaria in Manchuria, except for a focus of heavy infection in the Amur basin (Lahasusu and Taheiho) near the Maritime Provinces of Siberia; (6) the relatively light infection in Seoul, as contrasted with severely endemic foci in Southern Korea: and (7) the singularly low incidence of malaria in Hunan Province, in spite of the fact that climatic factors and the topography of the country would seem to favour a heavy and widespread distribution of the disease throughout the province."

Blackwater fever has been reported from the southeast coast, from Hankow and Southern Yunnan. "Possibly the recent use of quinine therapy in China may be responsible for the absence of blackwater fever throughout the greater part of the country." A map, readable with a magnifying glass, shows the known anopheline distribution.

Clayton Lane.

i. BOREL (M.). Anophèles et paludisme dans la région de Chaudoc (Cochinchine). Résultats d'une enquête faite du 16 au 21 janvier 1926. **[Anopheles and Malaria in Cochin-China and Annam.]**—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 806–811.

ii. ——. Paludisme en Cochinchine. Résultats de mesures prophylactiques à la plantation de Suzannah (11 au 13 août 1926).—*Ibid.* pp. 811–815.

iii. ——. Résultats d'une enquête épidémiologique et entomologique à Yaback (Annam.).—*Ibid.* pp. 845–852.

i. & ii. Agricultural improvement has lessened anopheline breeding, and the only species captured was *A. vagus*, but *A. hyrcanus nigerrimus* is held to be certainly present and larvae of *A. vagus* and *A. kochi* were found, while at Toy-Son live *A. barbriostris*, *A. hyrcanus* and *A. fuliginosus*.

Of 21 children examined at Suzannah, 4 showed *P. falciparum* and one *P. malariae*. *A. vagus* bred in cattle footprints, *A. kochi* in streamlet and puddles, *A. leucosphyrus* in shady pools and in tree holes, *A. barbirostris* in overgrown forest streams. In these cases antilarval measures are held to be more hopeful than others among people too poor or too careless to take quinine regularly, although both have contributed to success. In the first paper improved cultivation of pineapple, areca nut and coconut is advised.

iii. A plateau at an altitude of 850 m. (nearly 3,000 ft.) occupied by a coffee plantation with much malaria. Splenomegaly in children is invariable, but anaemia and parasites in the blood are not always in accord. The birth rate is low and infantile mortality high. No adult, but many larval anopheles were found (*A. maculatus*) and the percentage of species distribution was *P. falciparum* 51·7, *P. vivax* 20·68, *P. malariae* 27·6. And when as here the tiger carries off in a year 7 adults of a village population of 60, there is the more reason to include the plasmodium among those agents of death against which man's counter attack has to be launched.

C. L.

KOIDZUMI (Makoto). **On the Spread and Prevalence of Malaria in Formosa.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 27–29.

There are 2 annual malarial outbreaks in Formosa, one with its height in August or September, but beginning perhaps as early as May, and the other with its height in November or December and beginning 2 months earlier. In some localities only one of these outbreaks occurs. In the paper only " tropical " malaria is mentioned. In answer to a question, tropical and tertian were stated to occur. Laboratory-hatched specimens of *A. minimus*, *A. pleccau*, *A. tesselatus*, *A. maculatus*, *A. hatorii*, *A. splendidus* and *A. fuliginosus* developed oocysts of tropical malaria. " The most powerful transmitter of tropical malaria seems to be *A. tesselatus*. This species, however, is not so rich in number and *A. maculatus* seems to be taken as the most important transmitter in the Island."

C. L.

KOBAYASHI (H.). **Malaria in Chosen.**—*Mitt. d. Med. Akad. zu Keijo.* 1926. Vol. 9. No. 3 & 4. 1 p.

Only *P. vivax* has been detected in Korea, although other clincial types, especially quartan, prevail. *A. sinensis* is everywhere common. *A. coreicus* has been found. In 5 named hospitals, the malaria cases have fallen from 2,322 in 1921 to 635 in 1924, a decrease attributed to Government efforts to improve hygiene and the administration of quinine.

C. L.

CHRISTOPHERS (S. R.) & SINTON (J. A.). **A Malaria Map of India.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 173–178. With 1 folding map. [43 refs.]

This valuable coloured map has been compiled at the Malaria Bureau, Kasauli. The system of colouring is ingenious. Shades of red indicate an incidence which is markedly seasonal; this occurs in the subtropical, semi-desert parts and is characterized by an early summer malarial rise, a lull, and a marked autumnal rise following the south-west monsoon. Within this zone is another indicated in dark red, lying essentially in the submontane Punjab, which is swept by those appalling epidemic outbursts which have arisen about every eight years, and which give over an area extending even to 10,000 square miles a mortality of as much as 30 times the normal, with a spleen rate of 90 per cent. not returning to normal for 5 years. These outbreaks are focal, and largely dependent on diluvial conditions, resulting from abnormal rainfall too large for the rivers to remove. It is here that GILL'S forecasts have permitted prompt measures of prevention, and where, it may be added, there has been no major epidemic since 1908.

Shades of blue indicate a more constant incidence of malaria, in humid semi-tropical or tropical areas, with abundant breeding places, but the blue nevertheless contains healthy (green) areas in which, with anopheles, there is a spleen rate below 10 per cent. and which are usually associated with extensive rice culture. A dark blue shade indicates those hyperendemic tracts, with a spleen rate of 50 to 90, often sharply defined to within a few miles, deadly to non-immunes from 1,000 to 3,000 feet in altitude, and with the essential feature of low jungle or forest-clad hills. They contain the endemic foci of blackwater fever " the only essential for such a focus . . . . seeming to be the presence of resident Europeans or other susceptible race." A dark purple shade shows the other sort of hyperendemic area, that of the upper Gangetic delta, associated with decayed rivers and with lessened soil-fertility and economic prosperity. The Andaman area of high coastal endemicity, the western outpost, apparently, of the wide influence of *A. ludlowi*, has a special tone, and lastly the yellow tracts, without peril, are those lying at over 5,000 feet or so in altitude.

C. L.

MURPHY (R. A.). **A Few Notes on Malaria in Assam.**—*Proc. Assam Branch Brit. Med. Assoc. Annual Meeting, Silchar, 1st and 2nd March, 1926.* pp. 7–10.

In spite of mosquito nets, from 30 to 50 per cent. of Europeans in an average Assam district are infected yearly, but although subtertian malaria is common among them crescents are rare. In thick films, it is believed, determination of the species of malaria parasite is not generally possible. It is observed that enlarged spleen and immunity go together. Intramuscular injection is strongly advocated, " I have used them [intramuscular injections] with B. & W's. tabloids for 20 years and have had such good results, as have my Indian subordinates, that I remain unconvinced of their danger in Assam when given with reasonable care." [Murphy then characterizes certain writing by the abstracter upon intramuscular injection as " clever nonsense," a delightful oxymoron, and states that his patients, when given intramuscular injections *secundum artem*, ask for more. The abstracter has given such injections and regretted but few ; but it is impossible when reading the experiences of so many (as he has to do) to escape being deeply impressed. It is not necessary to go further from Assam than Calcutta or Malaya to find results very different from Dr. Murphy's among those whose skill and care cannot be doubted. There is certainly an unknown factor ; knowledge will not come by ignoring it.]

C. L.

BRENNAN (C. H.). **Ten Months of Malaria in Kisumu.**—*Kenya Med. Jl.* 1926. Dec. Vol. 3. No. 9. pp. 261–263.

In 507 slides positive for malaria, the percentage of kind of parasite found was subtertian 80, tertian 19, quartan 1. In one subject, who was forcibly suppressed for brawling in the market place, plasmodium, not alcohol, was the excitant. In 116 Europeans using the port of Kisumu as a base 90 cases of malaria were seen in a year.

C. L.

i. VOSKRESSENSKI (B.). Le paludisme dans le district de Kouba en Azerbaidjan. [**Malaria in Azerbaidjan, (S.E. Caucasus).**]—*Trav. Inst. Microbiol. et. Hyg. d'Azerbaidjan.* Baku. 1925–26. Nos. 2–3. pp. 1–57. With 2 charts.

ii. TCHER [TCH]ECHTOFF (A.). Le paludisme dans les districts de Gandja et d'Agdam en Azerbaidjan.—*Ibid.* pp. 58–73.

iii. ——. Revue de l'activité à la station pour le paludisme à Gandja de 1923 à 1925.—*Ibid.* pp. 74–87.

iv. ALTMAN (K.). Le paludisme au long de la Koura, dans les districts d'Agdam et Guéoktschay en Azerbaidjan.—*Ibid.* pp. 88–100. [All in Russian.]

In these papers are recorded the results of malaria surveys in different districts of the republic of Azerbaidjan (S.E. Caucasus). The detailed information regarding the geography, climate, hydrography and ethnography of these regions being of purely local interest, only the incidence and types of malaria are noted here.

i. During the summer and autumn months of 1925 the author examined 1,537 persons, including 857 children under 10 years of age, the average results for the total number examined being as follows :—spleen index 63·7 per cent., Ross's index 3·4 per cent., parasitic index 15·4 per cent. The respective figures for children were 64·1, 3·4, 19·6. The predominant form of malaria was benign tertian (62·5 per cent.) whilst malignant tertian was found in 16·6 per cent. of cases. As regards the seasonal distribution, benign tertian was prevalent from May to August, malignant tertian and quartan in September, whilst in October quartan fever was dominant.

ii. The examination of 1,946 persons (including 829 children) revealed the following results :—spleen index 74·4 per cent. (in children 71), Ross's index 4 per cent. (in children 3·8), parasitic index 28·6 per cent. (in children 34·4). *P. vivax* was found in 23·7 per cent., *P. malariae* in 27·7, *P. falciparum* in 41·2, mixed infections in 7·4.

iii. The Gandja Station was founded in 1923. In the course of three years, 8,692 cases of malaria were observed and diagnosed as follows :—*P. vivax* in 865 (34·3 per cent.), *P. praecox* (*falciparum*) in 471 (18·7 per cent.), *P. malariae* in 1,026 (41 per cent.), mixed infections in 129 (5 per cent.), undetermined forms in 28 (1 per cent.). Quartan malaria was thus predominant in the region served by the Station.

iv. The author notes the prevalence of quartan malaria (73·77–77·6 per cent.) benign (8·3) and malignant tertian (7·9) along the valley of the river Koura. Further inland quartan malaria is gradually replaced by benign and malignant forms.

C. A. Hoare.

RUSSIAN JOURNAL OF TROPICAL MEDICINE. 1926. No. 3. pp. 59–65; No. 8, pp. 67–80; No. 9–10, pp. 66–78. Index bibliographique des livres et des articles sur la malaria, parus jusqu'a 1914. [**Bibliographical Index of Books and Articles on Malaria up to 1914.**]

This *Index* will be appreciated by all malariologists, especially those not conversant with the Russian language, as it provides a presumably complete list of Russian publications on malaria up to 1914, the majority of which appeared in journals or dissertations inaccessible to foreign readers. There are 953 references, the names of the authors and journals being transliterated and the titles translated into French. [As the names are spelt phonetically and arranged according to the Russian alphabet, some familiar ones are unrecognizable and cannot easily be found in the list.]

C. A. Hoare.

MARTINI. [Ueber Stechmücken und Malaria in der Unabhängigen Sozialistischen Räterepublik der Wolgadeutschen. **On Mosquitoes and Malaria in the Autonomous Socialist Soviet Republic of the Volga Germans.**]—*Verh. Deutsch. Ges. angew. Ent., 5. Mitgliederversamml. Hamburg 16. bis 20.* 1925. Sept. pp. 48–55. 1926. Berlin. [Summarized in *Rev. Applied Entom.* 1926. Sept. Vol. 4. Ser. B. Pt. 9. p. 159.]

" In 1925 the author studied the mosquito fauna in the region of Saratov. As a result of famine the number of cattle has been very greatly reduced, and this region is the one where malaria was most rife during the epidemic of 1922–23. The character of the country, which includes the bed of the Volga with extensive areas that are subject to flooding, is described. Some specimens of *A. bifurcatus* were taken, but *A. maculipennis*, which is mainly responsible for the malaria, predominated. The author considers that as Anophelines readily bite cattle and other animals, where the number of cattle is suddenly diminished, they are driven to feed to an abnormal extent on man. Using the formulae suggested by Ross and taking the reduced number of cattle as 20 per cent. of the former stock the author concludes that the percentage of human beings infected with malaria has risen from about 8 per cent. to 98·5 per cent., a result that explains the epidemic "

C. L.

TRABAUD (M.). Le paludisme au Levant. [**Malaria in the Levant.**]—*Rev. de Méd.* 1925. Year 42. No. 10. pp. 1035–1040.

——. Aperçu sur la morbidité générale au Levant.—*Ibid.* pp. 1041–1045.

With much information of local interest is combined a record of considerable preventive activity :—drainage, issue of mosquito nets, abandonment of unhealthy cantonments, propaganda among troops and the civil population and the expenditure of 600,000 francs on quinine. From 1919–1920 to 1921–1922 army statistics showed the following yearly malarial attacks, invalidings and deaths, 2,973, 445, 51 ; 2,393, 603, 101 ; 1,527, 359, 48. The garrison has decreased.

C. L.

CLARA (Pilade). Considerazioni sopra una statistica di malarici. [**Some Malaria Statistics.**]—*Policlinico.* Sez. Prat. 1926. Oct. 11. Vol. 33. No. 41. pp. 1432–1433.

The statistics, which cover six years, concern certain places on the right bank of the Adda in the Province of Milan. Diagnosis was chiefly clinical. It is held that anti-anopheline measures ought to be added to quininization.

C. L.

MARCHOUX (E.). Le paludisme dans les Dombes et en Camargue. [**Malaria in Les Dombes and in Camargue (France).**]—*Bull. Acad. Méd.* 1927. Jan. 11. Year 91. 3rd Ser. Vol. 97. No. 2. pp. 67–89. [2 refs.]

Marchoux contrasts the malaria in these two spots on the Rhone. Les Dombes is a plain at the junction of the Rhone and Saône, where a clay subsoil hinders percolation, and which was notorious for malaria as long ago as 1247. In 1857 at least two-thirds of the population was infected ; to-day Marchoux managed to find one case. *Anopheles maculipennis* abounds both as larvae in the pools, and as adults in cowsheds, pigsties, stables and henhouses in that order. They are also found in the houses.

Carmargue is the Rhone delta, enclosed by embankments, with a considerable salinity, more fertile perhaps than the Nile delta and largely given over to pasturage, where it supports many thousand head of sheep, cattle and horses who have no shelter. Anopheles are relatively few, and the labour foreign—Italians, Spaniards, Serbs, Armenians and Russians. Their mentality is sufficiently indicated by the mother who protected her anaemic baby from the infamous suggestion that its finger should be pricked for a blood examination.

Marchoux believes that the difference in the two regions lies largely in the stabling of cattle which takes place in the one and is lacking in the other, holding that anopheles prefer beasts, but come to human habitation when they are not able to get what they want elsewhere.

C. L.

SMILLIE (W. G.). **Studies of an Epidemic of Malaria at the Gantt Impounded Area, Covington County, Alabama.**—*Amer. Jl. Hyg.* 1927. Jan. Vol. 7. No. 1. pp. 40–72. With 9 text figs., 6 charts & 2 maps.

Observations were carried out in this area, for one year before and two years after impounding water, by a number of persons, and are admirably assembled by Smillie. That the place was situated near the field training station of the International Health Board at Andalusia has facilitated this check. In 1922 a company was permitted to begin to dam the river Conecuh on condition that the area to be flooded, together with 25 feet above high-water mark, should first be cleared of the considerable woody growth which existed. This was improperly done, and malaria broke out. There was so much floatage that mosquito control was impossible. The lake was emptied and proper clearance started, power being temporarily obtained by a steam plant. This was burnt down and permission given to fill the lake temporarily until winter. However, malaria reappeared and in the still uncleared portion of the lake anopheline control was found impossible. Lowering the water level brought both factors under control. The anopheles which was influenced by these measures was *A. quadrimaculatus*; *A. crucians* and *A. punctipennis* were unaffected. It is accordingly concluded that the first is the mosquito vector and that the other 2 may be disregarded in future malaria campaigns in the Southern United States.

C. L.

BORDEN (William B.). **Anopheles Mosquitoes and Malaria at Eastern Army Stations.**—*Milit. Surgeon.* 1926. Oct. Vol. 59. No. 4. pp. 452–469. With 5 charts. [14 refs.]

A review of the literature is supplemented by charts showing the malaria and anopheline distribution in United States army stations on the Atlantic. It is concluded that *A. quadrimaculatus* probably is the main vector; that *A. pseudopunctipennis* is not, since its prevalence postdates the autumnal malaria outbreak. Malaria is greatest from May to October, *A. quadrimaculatus* from June to October, *A. crucians* in spring and *A. punctipennis* in autumn.

C. L.

BASS (C. C.). **The Influence of Malaria on the Progress of Civilization.** *Southern Med. Jl.* 1926. Dec. Vol. 19. No. 12. pp. 851–856. [7 refs.]

The Presidential address at the 20th Annual Meeting of the Southern Medical Association gives the reasons for believing that the cultures of Greece, Rome and Ceylon declined as the result of malaria, and the speaker is inclined to add to these the civilization of Egypt. In preventing progress, malaria has been equally effective; "malaria has been the greatest obstacle to colonization by the white race, and it is a greater foe to civilization in the tropics than is any other one factor." [Even if some would put promiscuous evacuation as the predominant enemy of native races, the anopheles is not far behind.]

C. L.

SENIOR-WHITE (Ronald) & WILLIAMSON (Kenneth). **The Future of Anti-Malarial Research.**—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 1. pp. 38–47.

It is quite impossible to give any adequate extract of this paper. It deals with the monetary benefits which must follow successful research. It emphasizes the steps which led to the costly and unnecessary elevation of quinine to prominence among the cinchona alkaloids; to the need of local study of anopheles; to the cost of oiling and subsoil drainage, which is such that by their means the problem of rural malaria in India is never likely to be solved; to the effect of peaty and mineralized waters on larvae, which opens up an enormous field of investigation; to our great ignorance of the normal life processes of plasmodium and mosquito, with glimpses of knowledge such as that the eggs of what is commonly called *Stegomyia fasciata* are dependent for their hatching upon bacterial stimulus; to ignorance of the plankton food of mosquito larvae of different species; and to many other matters of primary importance, if the malaria problem is to be solved. The paper is sure to be widely read and deeply studied, but these words merit immediate reproduction:

> " But let us be clear about what we should seek, and what are the moral pre-requisites of success. First and foremost is wanted a medicament, or a physiological or physical agent, which will utterly destroy the malarial parasite from off the face of the earth. That is the root of the matter. Secondly, means far more effective than at present exist of ridding ourselves of the mosquito. And, first and last, open-mindedness and generalship to permit, promote, and apply discovery. 'The enthusiast,' Sir Ronald Ross has remarked, 'is rare: the successful enthusiast very rare.' Those words convey a warning. For enthusiasm by itself is blind; and success in medical as in other investigations has in the past been determined, and must in the future continue to be so, by imagination, penetration, and sound inductive reasoning."

C. L.

DICKINSON (R. F. O'T.) **The Incubation Period in Malaria.**—*Jl. Roy. Army Med. Corps.* 1926. Nov. Vol. 47. No. 5. p. 381.

There is no malaria at Vacoas Camp, Mauritius. The incubation period of malaria in those who have paid a single visit to Fort George on the coast has been 12 to 14 days. A case is reported in which such a visit was followed by subtertian malaria in 7 days in one who had never previously suffered from malaria.

C. L.

PADILLA (Tiburcio). Pruebas diagnosticas del paludismo latente. [**The Means of Diagnosis in Latent Malaria.**]—*Semana Méd.* 1926. Aug. 5. Vol. 33. No. 31 (1699). pp. 319–322. [44 refs.]

A review of those provocatives which, in latent malaria, throw parasites into the blood stream. They are classed as: (1) Those acting through protein shock, such as serum, vaccines and milk, which may produce disagreeable effects and perhaps sensitization. (2) Substances acting on the circulation—ergot, benzol, adrenalin, pituitary extract, strychnine, nitroglycerine. (3) Substances acting on the parasite—quinine and arsenic. (4) Physical means—hot and cold douches and packs, vapour baths, massage and faradization of the spleen, X-rays, insolation and exposure to ultra-violet rays. The methods advised are adrenalin injection and exposure to ultra-violet rays.

C. L.

VESTSCHEZEROW (N. I.). Einige Beobachtungen an natürlicher Infection und experimentell erzeugter Ansteckung von Anopheles-weibchen mit Malariaparasiten. [**Observations on Natural and Experimental Infection of Anopheles with Malaria.**]—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. German summary pp. 233–235. With 6 figs. on 1 plate. [In Russian pp. 153–160. 1 ref.]

A malaria expedition by STRADOMSKY to the Caucasian coast of the Black Sea dissected 194 female *Anopheles maculipennis*, which after capture in communal sleeping quarters of infected persons were kept for five days before examination. Of those first examined 20 per cent. were infected. After a month's quinine treatment of the inhabitants the anopheline infection rate fell to 7·14 per cent. The average percentage apparently for the three months, July to September, was 6·7. Sporocysts were found in 7 and "merozoits" in 6. Certain mosquitoes were bred out from larva or pupa and nourished on infected persons. Nine were fed on quartan infections, which had 65 to 372 gametocytes to the cmm., and were kept at 25–29° C. Oocysts developed in none. Four *A. maculipennis* were fed on tertian blood having 348 gametocytes per cmm. and were kept at 22·5–25° C. On the eighth day small oocysts were found in 3. Fifteen *A. maculipennis* and two *A. bifurcatus* were fed on subtertian blood having only 10 crescents to the cmm.; both species became heavily infected. Ross's black spores were found in the midgut, 5 times in natural (associated in 4 with sporozoits in the salivary glands) and once in artificial infections. Further there were found in the salivary glands Ross's spores once and an oocyst once, a point on which stress is laid.

C. L.

CABRED (Roberto G.). El reticulo en el higado y bazo de palúdicos. [**The Spleen and Liver Reticulum in Malaria.**]—*Semana Méd.* 1926. Sept. 2. Vol. 33. No. 35. (1703). pp. 581–585. With 2 text figs.

Using a silver nitrate process, the author finds in malarial cases alterations in reticulum of spleen and liver in the direction of increase and complexity of fibrils. In the liver the change is greatest about the central lobular veins, and in the spleen it is diffuse and affects all parts including the malphigian bodies. Although care has been taken to exclude other infections, it is held not impossible that the changes may result from chronic stasis other than that due to chronic malaria.

C. L.

THOMSON (John Gordon) & ANNECKE (S.). **Observations on the Pathology of the Central Nervous System in Malignant Tertian Malaria, with Remarks on certain Clinical Phenomena.**—*Jl. Trop. Med. & Hyg.* 1926. Oct. 15. Vol. 29. No. 20. pp. 343–346. With 2 plates. [17 refs.]

This paper is mainly concerned with "malarial nodules" in the brain, first noted by MARGULIS (1914) [this *Bulletin*, Vol. 5, p. 245] and latterly particularly stressed by SEYFARTH. Various portions of the cerebrum of 12 cases were examined, and in 2 of them the cerebellum also. "In the case illustrated, the most striking feature was the association of these so-called granulomata with numerous punctiform haemorrhages" the haemorrhage being a precursor. Although DURCK has found the two independent, Thomson and Annecke are led to consider the "granuloma" as a result of haemorrhage. They point out that chronic mental and nervous symptoms are attributed to malaria, and that, in view of such lesions as they have found, these require further study.

C. L.

GRAF (E.). Beitrag zum Verlauf der Kriegsmalaria. [**The Course of War Malaria.**]—*Klin. Woch.* 1926. Sept. 17. Vol. 5. No. 38. pp. 1807–1808. [5 refs.]

It is held that seven years after the war and seven to nine years after infection cure remains uneffected in 10 per cent. of the malaria cases observed, the proportion being higher for subtertian infection. Functional disturbance of the nervous system is frequent.

C. L.

LI (K. H.). **Malaria—a Review of 90 Cases.**—*Nat. Med. Jl. China.* 1926. Aug. Vol. 12. No. 4. pp. 284–296. [1 ref.]

" A review of the records of a series of 90 cases of malaria treated [at Soochow] during the year 1924 revealed the fact that malaria was most prevalent and severe during the month of November, that the clinical manifestation was most varied, but complications were few in number ; that the aestivo-autumnal type of infection was most common ; and that malarial stippling of the red blood corpuscle was a distinctive feature of the blood changes associated with this type of infection ; and that this stippling, if associated with a high large mononuclear count and a tenderness over the splenic region, whether it be enlarged or not, is a fair evidence of malarial infection even if the parasite cannot be found ; and that for treatment, quinine in doses of 30–45 grains daily is in the majority of cases sufficient to combat the disease, although in a few cases novoarsenobenzol has a distinct and prompt effect when used in conjunction with quinine."

C. L.

STRACHAN (A. S.). **Cerebral Malaria.** [Notes on Cases.]—*Med. Jl. S. Africa.* 1926. Aug. Vol. 22. No. 1. pp. 13–14.

Blood and mucus, passed in 25 or more motions daily, disappeared under the emetine treatment [which is apparently considered obligatory nowadays.] A fortnight later they recurred with delirium, fever and death. At autopsy the bowel showed a few scattered submucous haemorrhages and no ulceration. Seemingly, sections were not cut from the intestine, although sections and smears showed subtertian malaria parasites in spleen, liver and particularly brain. Reference is made to FALCONER and ANDERSON's series of malarial dysenteries with no intestinal lesions but submucous haemorrhages (this *Bulletin*, Vol. 12, p. 44).

C. L.

DE CASTRO (A. Bayley). **A Case of Cerebral Malaria, presenting Unusual Features.**—*Indian Med. Gaz.* 1926. Dec. Vol. 61. No. 12. pp. 605–606. With 1 chart in text.

A prisoner in the Andamans had daily rigors and *P. vivax* in the blood, and was put on quinine and alkali mixture. After four days of this the temperature went up, after an initial rigor, to 104° F. Later he became violently delirious and comatose, acute pulmonary oedema supervened and he was in extremis. A sudden change in the breathing occurred with gradual regaining of consciousness and the appearance of an urticarial rash. Malaria parasites were absent from two films taken during unconsciousness. An editorial note suggests dengue as a diagnosis, since this sometimes shows cerebral symptoms.

C. L.

DIMITRI (V.). Manifestaciones nerviosas del paludismo. [**Nerve Manifestations of Malaria.**]—*Semana Méd.* 1926. Nov. 4. Vol. 33. No. 44 (1712). pp. 1215–1219.

This paper is concerned essentially with malaria neuralgias of the cranial nerves. It is held that in these cases there is a tender tract of cranial nerve readily detectable on pressure and that it constitutes a specific index of latent malaria. These cases must be subjected to prolonged quinine treatment. Herpes zoster may occur. The conditions appear in acute or chronic malaria, and that there is a causal connexion is held to be established partly by the history and partly by the cure of the neuralgia after quinine treatment.

C. L.

DE ROMA (Giovanni). Orchite malarica. [**Malarial Orchitis.**]—*Riforma Med.* 1926. Aug. 9. Vol. 42. No. 32. pp. 764–765.

Tertian malaria was established microscopically and with it appeared an orchitis with the usual clincial signs. The malarial manifestations and the orchitis disappeared. A month later both reappeared and progressed under three daily intramuscular injections of sterile water, to disappear rapidly under quinine.

C. L.

MALLIK (K. L. Basu). **A Case of Malarial Haemoptysis.**—*Indian Med. Gaz.* 1926. Oct. Vol. 61. No. 10. pp. 501–502. With 1 chart in text. [3 refs.]

A man with scanty rings of *P. falciparum*, a temperature of 103° F., crepitations and, later, a basal patch of consolidation, coughed up blood in fairly large amount. Under intramuscular and continued oral quinine the temperature came down and, by the chart produced, did not vary by so much as a single decimal point from 98·4° for 14 days; and at the same time the haemoptysis ceased. This was considered malarial, no elastic fibres or tubercle bacilli having been found in 12 examinations and no possible source of bleeding having been detected in the nose or throat.

C. L.

WESELKO (Otmar). Comparsa di suppurazioni durante la malaria. [**The Appearance of Suppurations in Malaria Patients.**]—*Riv. di Malariologia.* 1926. May–June. Vol. 5. No. 3. pp. 303–305. With 1 chart in text. [English summary p. 351.]

"In malaria patients slight bruises may determine very severe suppurations. The writer reports about 8 cases ascertained during one year's period at the Antimalarial Station of Skradin (Jugoslavia), where he is Director, and describes one, having had a fatal issue, in a pregnant woman who showed subtertian malaria and whose shoulder joint had been struck. In all cases the pus was sterile. Histological examination showed degeneration of muscular fibres and obstruction of small arteries."

C. L.

OCCHIPINTI (Giovanni). Di una localizzazione articolare di natura malarica. (Nota clinica). [**Relapsing Arthritis in a Case of Malaria.**] —*Riv. di Malariologia.* 1926. July–Aug. Vol. 5. No. 4. pp. 467–468. [English summary p. 552.]

In a man 55 years old, intense reactions in the tibio-tarsal articulation coincided with attacks of malarial fever or preceded them by a few days; they disappeared with quininization, whilst without the administering of quinine, they assumed greatest intensity, until they presented characteristics of acute arthritis, responding, together with the attack of fever, to quinine. No examination of the blood is reported.

C. L.

MIKÉLADZÉ (Ch.). Sur la relation entre les pressions artérielles et la viscosité sanguine chez les paludéens. [**Arterial Pressure and Blood Viscosity in Malaria.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 540–546. [6 refs.]

The blood pressure was determined by auscultation with a Riva-Rocci sphygmomanometer, the viscosity by HESS's apparatus. Although it was found that the pressure and viscosity both fall in malaria of all forms and that the viscosity itself falls more or less parallel with the loss of red corpuscles and haemoglobin, yet the fall in pressure cannot be due to lessened viscosity since, in individual cases, the curves of the two series may be quite different.

C. L.

BENHAMOU (Ed.). L'aorte dans le paludisme. [**The Aorta in Malaria.**] —*Ann. de. Méd.* 1926. Aug. Vol. 20. No. 2. pp. 145–157. With 3 plates. [Refs. in footnotes.]

Associated with malaria Benhamou finds on the radioscopic screen, so extremely frequently as to constitute a definite stigma of malaria, a regularly outlined, normally tinted dilatation of the ascending aorta accompanied by cardiac dilatation, pain, dyspnoea with air hunger, and a soft systolic, aortic murmur. All these symptoms and signs disappear when the malaria is suppressed by quinine treatment. The malaria of birds produces no aortitis; equally the conditions in man point not to aortitis, but to hypotonic, functional dilatation. The mechanism of its production is believed to be the sharp rise in maximum blood pressure which accompanies each paroxysm, since the change does not take place when paroxysms are slight or spaced. Quinine and digitaline are the drugs indicated and prophylactic quinine the best means of preventing the condition.

C. L.

INHELDER (Heinrich E.). Malaria und Askariden. [**Malaria and Round Worms.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 431–433. [3 refs.]

From Kayintschu, South China, Inhelder reports a boy of 5 admitted with a provisional diagnosis of meningitis. He lay moaning with head retracted, knees drawn up, belly sunken, the whole body covered with red spots, some raised, some not, some confluent forming a patch as big as the palm of the hand. Dilated pupils, twitching limbs, nystagmus, squint, positive Kernig and Brudzinki's signs, pulse 120, pulmonary crepitations, slightly enlarged spleen, axillary temperature of 39·6°, *P. falciparum.* After taking quinine, he next morning lost his fever, but remained unconscious. Faeces extracted from the rectum showed trichuris and many ascaris eggs. Calomel and santonin removed " innumerable " ascarids, but patience did not endure beyond counting 70. The next day he was cheery and insistent in demands for toys and food. The writer publishes the case as being of a kind not mentioned in books. [Such cases, but without the rash, were not infrequent in Darjeeling District hospitals, Bengal, India, where malaria and a heavy ascaris infection often coincided.]

C. L.

DEMJANOW (G. S.). Ueber die Appendicitis malarica. [**Malarial Appendicitis.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. No. 26. Vol. 100. No. 7–8. pp. 348–353. With 1 text fig. [5 refs.]

It is held that the appendix reacts to malaria as to other infections by hypertrophy of its lymphatic system, and that " pigment-thrombi " must be accepted as causing appendicitis. Acute attacks and relapses are held to be associated with malaria, which can cause appendicular colic.

C. L.

VOIZARD (Fr.). Paludisme autochtone et somnambulisme. [**Autochthonous Malaria and Somnambulism.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 675–676.

The " somnambulism " included a temperature of 40° C. and a sporting spectacle in which the man gave, among other events in an upper room, an exhibition of swimming, a boxing match and a 100 metre and 400 metre sprint. A similar show four days later ended by a fine dive through a window, an attendant catching him just in time to prevent catastrophe. The finding of *P. vivax* in the blood and the giving of quinine entirely stopped these nocturnal, sporting, single-entry meetings.

C. L.

BONORINO UDAONDO (C.) & SANGUINETTI (L.V.). [**Malarial Gastro-Enteropathies.**]—*Arch. Arg. del. Ap. Digestivo.* Buenos Aires. 1926. Vol. 1. p. 817. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Oct. 30. Vol. 87. No. 18. p. 1519.]

Of ten malaria patients, acidity was increased in two and lessened in two; there was achylia in three. The gastro-intestinal disturbance of malaria is apt to be confused with that occurring from quinine administration, and in one case in which this condition improved only temporarily under quinine [perhaps by mouth] it cleared up under salvarsan. The pathological basis is referred to as gastritis, enteritis or "parasitic capillaritis."

C. L.

TEIXEIRA (Edison). Sobre um caso de accesso pernicioso palustre de forma meningéa. [**Pernicious Malarial Attack taking a Meningeal Form.**]—*Rev. Med.-Cirurg. do Brasil.* 1926. July. Vol. 34. No. 7. pp. 292–295.

A black man of about 30, tall and strong, showed complete indifference to all his surroundings ; was irresponsive or answered vaguely and without comprehension ; speech disconnected ; incessant repetition of the word "fall" ; showed Kernig's sign, dilated pupils, and contraction of the muscles of the neck and lumbar region. Cerebrospinal meningitis, perhaps epidemic, was diagnosed. Later accessions of fever directed attention to the blood, where forms stated to be characteristic of the benign tertian parasite were found. Quinine treatment left him with no signs worth note.

C. L.

ARIAS ARANDA (C.). [**Congenital Malaria.**]—*Arch. Latino-Amer. de Pediatria.* Montevideo. 1926. Sept. Vol. 20. p. 533. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Jan. 1. Vol. 88. No. 1. pp. 65–66.]

The mother, an old malarial case, had malarial attacks during the ninth month of pregnancy. On the second day the child showed schizonts and gametocytes of *P. vivax*, and died when thirty-six hours old, partly the result of the mother's neglect.

C. L.

MONEY (R. Angel). **A Case of Malaria acquired in Sydney.** [Reports of Cases.]—*Med. Jl. Australia.* 1926. Aug. 28. 13th Year. Vol. 2. No. 9. pp. 283–284.

A man who had left Scotland 15 months earlier, spending a day at Port Said and another at Colombo on a direct voyage to Sydney, out of which district he had not since moved, contracted double benign tertian malaria microscopically established. The particular locality near Sydney at which the infection was presumably acquired is discussed.

C. L.

SAVAGE (P.). **A Case of Rupture of the Spleen during an Attack of Malaria.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 552–553.

The history is given of a British soldier who died in hospital without history of injury, nor was there any post mortem evidence of it. He had fainted before admission, but was reading comfortably in bed on the morning of his death. The abdomen was found full of blood, but the spleen so diffluent, breaking at the slightest touch, that the original lesion was not demonstrable. Rigor mortis was still present. The writer had seen another case of splenic rupture in an Egyptian labourer evacuated over an atrocious road on service. He arrived dead, splenic rupture being attributed to the severe jolting.

C. L.

HÖRLEIN (H.). Ueber die chemischen Grundlagen und die Entwicklungsgeschichte des Plasmochins. [**Plasmochin. Its Chemistry and the History of its Development.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 3. pp. 305–310. [2 refs.]

ROEHL (W.). Die Wirkung des Plasmochins auf die Vogelmalaria. [**Plasmochin and Bird Malaria.**]—*Ibid.* pp. 311–318.

SIOLI (F.). Prüfung des Plasmochins bei der Impfmalaria der Paralytiker. [**Plasmochin in Inoculation Malaria.**]—*Ibid.* pp. 319–324. With 4 charts in text.

MÜHLENS (P.). Die Behandlung der natürlichen menschlichen Malariainfektionen mit Plasmochin. [**Treatment of Natural Malaria with Plasmochin.**]—*Ibid.* pp. 325–335.
Also in *Naturwissenschaften.* 1926. Nov. 26. Vol. 14. No. 48–49. pp. 1154–1166. With 4 charts in text. [2 refs.]

These papers deal with the new synthetic quinine substitute Plasmochin, as appears to be its English dress. Hörlein deals with its chemistry, Roehl with its action on bird malaria, Sioli with that on injected malaria of general paralytics, and Mühlens with its use in natural malarial infection of man.

The high price of quinine, the need to use large doses, its bitter taste and its failure to remove crescents from the blood have led to a search for a stronger and better drug. The structure of quinine is held to consist of a quinoline nucleus to which is attached a second ring system, the so-called chinucludin residue. Hörlein, however, looks upon it as a complicated alkalamino-6-methoxyquinoline, and considers the synthetic plasmochin as being " of the same class of body."

It has been established, notes Roehl, by KOPANARIS, MARKS, the brothers SERGENT and GIEMSA that, apart from arsenicals, the substances effective against malaria in man are effective against bird malaria. For the first time the process is reversed, and a substance giving satisfaction in bird malaria is found curative for human malaria. The method of administration here adopted has been, not intramuscular injection into the breast muscles, but injection, little by little through a tube passed into the canary's stomach, of 1 cc. of solution for each 20 gm. of body weight. Canaries injected intramuscularly with blood containing *P. relictum* show parasites in the circulating blood after 4–5 days. If a canary so injected be fed once daily with this quantity of fluid for 6 days only, the parasites will, if the solution have been of a strength of 1 in 200, 1 in 400 or even 1 in 800, first appear with regularity in the blood, never before the 10th, usually between the 11th and 12th days, or yet later ; but if it be weaker than this, they will appear at the same time as in untreated controls. The highest strength tolerated is 1 in 200, the lowest effective 1 in 800, or a proportion of 1 to 4. Injecting the same quantity of fluid into the stomach for 6 days after infection, plasmochin need only be in a strength of 1–50,000 to restrain the appearance of parasites in the blood till the 10th day. It is sixty times more effective than quinine. 1 in 1,500 is the strongest tolerated solution ; or a thirtieth of the strength of quinine. If stronger doses than 1 in 1,500 be actually used the period of latency may be lengthened to 6 weeks. The gastric administration of plasmochin (1 in 1,500) from 2 hours before to 6 hours after the moment of infection inhibits the appearance of parasites in the circulation, a circumstance held to be in favour of a direct action. The question came to the mind, what value have these observations for man ? For instance, a man of 50 kgm. would receive at least 0·5 gm. quinine daily or 10 mgm. per kgm. A dosage of 1/800 gm. of quinine to a 20 gm. canary meant a dosage of 60 mgm. per kgm. or 6 times as much.

For a man, as Sioli notes, the first experiments showed that a dosage of over 0·05 gm. 5 times a day produced symptoms of poisoning. The upper limit was accordingly fixed at 0·05 gm. 3 times daily and the lower, by clinical and microscopic examination, at 0·0125 gm. daily for 3 days. The dosage found effective was 0·08 gm. daily for 3 days, divided into 2 or 4 doses; treatment being resumed after 3 days and continued in this manner for 2 or 3 weeks. A single 3 days course of 0·05 gm. 3 times a day was followed by relapse at 17 days interval; if that dose were given twice a day, after 11 days; if once a day, after 9 days; in a dose of 0·025 gm. once a day for 3 days, after 4 days. No tolerance was noted. One man, who had taken in 8 days 0·6 gm., complained of hepatic pain and weakness, became ashen grey with livid lips, but with no other definite signs, except that the fresh blood was chocolate coloured and showed the methaemoglobin spectrum, as did the urine. The latter had a greyish deposit with dark supernatant fluid. On attempting to leave bed he collapsed. Recovery was rapid, but the skin did not regain its colour for 3 weeks. In 7 of 40 cases treated with daily doses of plasmochin exceeding 0·1 gm., there appeared cyanosis of the lips; in 2, there was jaundice; there were no deaths.

Regarding treatment of naturally infected persons, Mühlens notes that daily dosage of 0·1 gm., or at most 0·15 gm., was taken by patients for several days without ill effects, that capsules of 0·05 once or twice daily or tablets of 0·02 (which may be broken up in water) 5 times daily, were administered without complaint of taste, for the preparation is quite tasteless, but that cyanosis of lips, tongue, gums and finger nails showed after the higher doses. The interrupted treatment may be continued for 4 to 6 weeks, but the drug has been given continuously for 14 days. Tertian and quartan parasites disappear from the peripheral blood more rapidly than subtertian, and cure is more readily effected in these infections by plasmochin than by quinine, the reverse holding for schizonts of *P. falciparum*, although crescents disappear rapidly with the new drug. Great stress is laid upon this hygienic sterilization of subtertian malaria, and the findings are held to be contrary to SCHAUDINN'S idea of parthenogenesis of schizonts from crescents, seeing that crescents disappear but relapses continue. These have amounted to 31 per cent., as against 59 for quinine. Tablets of combined quinine 0·125 gm. and plasmochin 0·01 gm., in subtertian malaria particularly, will attack all the human life stages. The cyanosis is not considered as an intoxication symptom, but an unaesthetic vasomotor effect of a neuropathic nature, and the drug is advised for blackwater fever.

[This conclusion is in face of Sioli's demonstration of methaemoglobinaemia and of a urinary condition which appears to be that of blackwater fever induced, be it noted, in *P. vivax* infection.]

C. L.

PROCTOR (A. H.). **The Dispensary Treatment of Malaria in India.**—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 1. pp. 36–38.

There are two important points raised here. The first is the inadequacy of quinine administration in outlying dispensaries in Bengal, where, constantly, a single dose is administered unless the patient brings a phial—which he is unlikely to do. If he should, he gets one day's medicine. Probably he does not come back and quinine falls into disrepute. Again, the grant allotted for medicines is quite inadequate to supply the quinine necessary, so that in one case the dosage per ounce was cut down to 5 instead of 10 grains, and the stock bottle proved on analysis to contain only 3. The second point is an agitation, or policy, in Bengal to start medical schools in various Districts, utilizing the Sadar or District-headquarters hospitals, with their limited staffs, unsatisfactory buildings, poor sanitation and equipment, lack of special departments and almost absolute lack of nursing. [It certainly seems an excellent move from the point of view of those who desire to bring " European medicine " into disrepute.]

C. L.

VISWANATHAN (A.). **Intramuscular Quinine Injections in Malaria.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. p. 398.

Quoting Colonel PROCTOR'S opinion, that " nothing would induce him to have an intramuscular injection of quinine," the writer instances 300 cases, which leave him unconvinced as to its supposed dangers. The precautions taken to prevent pain and abscess were—the strictest asepsis, a solution not stronger than five grains in 20 minims, different needles for drawing quinine into the syringe and for injection—so that there was no quinine outside the needle, emptying the needle of air [though presumably not carried so far that any quinine escapes], injection into the upper and outer part of the gluteus, gentle massage, rapid withdrawal of the needle to prevent the solution following it along the track and producing pain in the subcutaneous tissue, and the closure of the opening by collodion or friar's balsam. The ideal subject is a " stout muscular person " ; [and does not the explanation of the freedom from pain and induration lie, at least in part, just there ; for fortunately most of us are, both in fingers and glutei, quite unlike the princess with her pea and her mattresses.]

C. L.

HOUSSIAU & DUWEZ (José). Quinquinas et quinine. [**Cinchona and Quinine.**] —*Bruxelles-Méd.* 1926. Aug. 29. Vol. 6. No. 44. pp. 1288–1295. [5 refs.]

Some matters of interest emerge from familiar surroundings. Intramuscular injections may safely reach in bulk 6 to 8 cc. in the fat, half that quantity in the lean. The risk of haemoglobinuria from heavy quinine injection in the Belgian colonies is grave. There is a very useful table showing the confusion between the French and Belgian nomenclature of the salts of quinine. A prescription for neutral sulphate of quinine will be dispensed as the sulphate in Belgium and the bisulphate in France, and one for the neutral chlorhydrate will be interpreted as the hydrochloride in Belgium and the bihydrochloride in France. The matter is of some importance, since Burroughs and Wellcome tabloids, presumably those sold in Belgium, are labelled in English " Quinine Bisulphate " (soluble sulphate of quinine) and in French " Sulfate neutre de quinine," which does not conform to Belgian custom. C. L.

ARROYABE (Vicente) & ALVARADO (Ricardo). Sobre un método práctico de tratar la intolerancia para la quinina. [**A Practical Method of treating Quinine Intolerance.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 145–146.

An Italian of 27, suffering from malaria, stated that when treated with quinine he suffered from violent pruritus involving the whole body, accompanied by sneezing and lacrimation. The symptoms came on 15 or 20 minutes after taking quinine by mouth or injection, and lasted for about ten hours. *P. falciparum* being found, and the susceptibility being confirmed, he was given an injection of 1 cc. of adrenalin solution, followed in 20 minutes by one of 0·05 gm. of quinine, without ill effects. The next day he received a like treatment, the dose of quinine being, however, raised to 0·5 gm. After 4 days of this treatment, the quinine was raised to 0·75 gm. for 3 days, with a slight but perfectly tolerated reaction. A final injection of 1 gm. gave little trouble.

C. L.

ASCOLI (Victorio). El tratamiento especifico del paludismo. [**Specific Treatment of Malaria.**]—*An. del Depart. Nac. Hig.* Buenos Aires. 1925. July–Dec. Vol. 31. No. 2. pp. 11–24.

This paper, presented to the International Malaria Conference held at Rome in 1925, contains, besides much that is common knowledge, the following points. The irritant and necrotic action of quinine is such that when subcutaneously or intramuscularly injected its strength should not exceed 0·3 to 0·5 gm. per cc. and the total quantity 2 cc. ; otherwise it may produce an inflammatory reaction, aseptic or septic as the case may be, with slow absorption. Extirpation of primitive malaria requires 1 or 2 months treatment for tertian but 6 or 7 for subtertian malaria. After noting other drugs, the pre-eminent position of quinine as an antimalarial remedy is emphasized.

C. L.

TANON (L.) & JAMOT (E.). Le quino-thorium dans le traitement du paludisme. [**Quinothorium in the Treatment of Malaria.**]—*Rev. Méd. et Hyg. Trop.* 1926. July–Aug. Vol. 18. No. 4. pp. 105–110.

Quinothorium is a solution put up in ampoules of 2 cc., of which each contains 0·5 gm. of " chloroformate de quinine " and 0·1 mgm. of mesothorium, which is the adult dose, given by intramuscular injection into the gluteal region below the horizontal line, passing through the tip of the great trochanter. The injection is painful, particularly apparently if too near a bone. Between 10 and 20 years of age, the quantity is two-thirds of an ampoule ; and from 2 to 10 years, a half. The doses are given daily for 6 days and then every other day. Twelve or more ampoules are given. Several illustrative cases of its action on *P. vivax* infection are described—where it produced apparent disinfestation, in one over an observation period of fifteen months, when there was said to have been difficulty in effecting this with quinine. It is suggested that the radioactivity of bromide of mesothorium adds to the effect of quinine.

C. L.

WALDORP (Carlos P.). Tratamiento del paludismo por la asociación del sulfato de berberina por via digestiva y el sulfato de quinidina per os o intramuscular. (Nota preliminar). [**Treatment of Malaria by combining Berberine by Mouth with Oral or Intramuscular Quinidine.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 133–135. [5 refs.]

Berberine is used as a provocative in tablets of the sulphate containing 0·2 gm., of which 8 or 10 daily are given to adults and half the quantity to children. This will transform a simple tertian or quartan fever to a double one. When the fever is well alight intramuscular injections 0·25 gm. of sulphate of quinidine are repeated daily for 10 days. In heart-block quinine is substituted for quinidine. It is noted that the treatment has been checked by blood examination. Details are not supplied.

C. L.

QUINTANA (Héctor) & ÁLVAREZ SOTO (Napoleón). La berberina en el tratamiento del paludismo. [**Berberine in the Treatment of Malaria.**]—*Semana Méd.* 1926. Oct. 7. Vol. 33. No. 40 (1708). pp. 943–945.

This alkaloid obtained from the root of *Berberis* sp. acts on the smooth muscle of the spleen which it reduces in size. A large experience over 14 years has convinced the writers that, although given alone it is useless, when associated with quinine it gives results, especially when there is chronic splenic enlargement, constantly superior to those of quinine alone. No figures are supplied.

C. L.

GRAVOT. Quelques observations au sujet de l'action exclusive du stovarsol sodique sur le paludisme à *Plasmodium vivax.* [**The Action of Sodium Stovarsol in Benign Tertian Malaria.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. July–Aug.–Sept. Vol. 24. No. 3. pp. 350–361.

Thirteen cases are reported in which 1, or sometimes 0·75 gm., of sodium stovarsol was injected intravenously or intramuscularly, generally once only, and where thereafter *P. vivax* had disappeared over an observation period of several weeks. It is urged that this injection is painless, effective and without reaction and should be employed for every one under military control during any period of active operations. It should, however, be noted, that the first case reported had, 7 hours after an intravenous injection, a dyspnoeic crisis with rapid, short breathing, right-sided intercostal pain and diffuse bronchitic râles, explained as coincidence of a bronchitic attack with the injection.

C. L.

ALVARADO (Ricardo) & GONZÁLEZ (Conrado). Observaciones sobre el Stovarsol por via digestiva en el paludismo. [**Oral Stovarsol in Malaria.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 87–89.

Stovarsol tablets (0·25 gm. each) were given to 5 persons, three taking 12, one 13, and one 20. The observation period appears to have been 3 days. In 4 cases (*P. vivax* 1, *P. malariae* 2, *P. vivax* and *P. malariae* 1), no parasites were detected in the second examination. In the fifth (*P. falciparum*) they persisted in smaller quantities.

C. L.

MARCHOUX (E.) & QUILICI (P.). Le stovarsolate de quinine dans la tierce maligne. [**Stovarsolate of Quinine in Subtertian Fever.**] *Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 782–783. [1 ref.]

Referring to the work of BOYÉ [this *Bulletin,* Vol. 23, p. 820] the writers report a case (presumably put to bed) taking 2 tablets of stovarsolate of quinine or 0·25 gm. quinine daily. On the third day the temperature fell to normal and schizonts had disappeared, but crescents continued in spite of there being no break in treatment. The total dosage is not stated.

C. L.

AGUIRRE PLATA (Carlos). Los accidentes del 914 y el Paludismo. [**Malaria and Ill Effects of " 914 ".**]—*Repert Med. y Cirug.* Bogota. 1926. May. Vol. 17. No. 8 (200). pp. 457–462.

Intravenous injections of " 914 " can produce immediate and delayed ill effects. Immediately there may appear signs of " protein shock "—swelling and redness of face, lips, eyelids and tongue, difficulty in swallowing, acceleration of the pulse, flushes of heat, cerebral oppression, tinnitus, vertigo, dyspnoea, collapse, vomiting, diarrhoea, death. Nevertheless, where quinine resistance is held to have occurred, 914 is credited with brilliant results in malaria. No details are given.

C. L.

LARGE (D. T. M.) & BONAVIA (V. J.). **Arsenic and Antimony in Malaria.**—*Jl. Roy. Army Med. Corps.* 1926. Dec. Vol. 47. No. 6. pp. 430–438.

Forty severe relapsing cases of malaria with enlarged spleen and anaemia are reported. Since officers treated for malaria in India do not relapse with that frequency with which the men do, it was thought that a deficiency of vitamins in the diet of the latter might be a factor of importance. Accordingly those used in this series had a diet under which a gain of half a pound a day was normal, and there was no difficulty in filling the special ward where such fare was forthcoming. Stovarsol, soamin, kharsulphan were the arsenicals and von Heyden 471 the antimonial given. None of the drugs used proved superior to the quinine given to 7 controls who " were treated as malaria is treated in all military hospitals." Three of the controls relapsed. Diet did not prevent relapse and it is suggested that one of the factors which does so in the case of officers is the early treatment which the better informed officer has obtained, and his persistence therein. The men constantly had several attacks, so they reported, before going sick.

C. L.

JOUKOWSKY (J.). [Au sujet du traitement de la malarie par soluisin.] [**Treatment of Malaria with Soluisin.**]—*Russian Jl. Trop. Med.* 1926. Nos. 6–7. pp. 7–10. [In Russian.]

The author records the results of treatment of 20 malarial cases with a modified preparation of soluisin (for which the following prescription is given—" hydr. bichlor. corros. 1·4 ; natri arsenic. 0·5 ; natri iodati 24·0 ; stib. kali tartar. 0·1 ; aq. dest. 100·0 "), which was first applied in malaria by Dr. PRIADKO, in Turkestan. The course of treatment consisted of 12 intramuscular injections, which were administered for 2–3 days in succession, followed by intervals of 1–2 days. The interruptions were necessitated by development of pain at the site of injection and, in some cases by gingivitis stomatitis and diarrhoea. It is also noted that the injection of soluisin caused a reaction in temperature.

The individuals selected for treatment were suffering from chronic malaria and had previously undergone repeated treatment with quinine. They were all emaciated with severe anaemia, and unfit to carry on their ordinary occupation. In 3 cases no parasites were found, though all the clinical symptoms of malaria were present; in the other 17, plasmodia representing all the 3 types of malaria were found, the subtertian predominant. The complete disappearance of gametes was usually observed after 3–4 injections. Eight patients received the full treatment with soluisin, and 5 had 8–10 injections. Positive results were obtained in 10 of these 13 cases. Eight of these were kept under observation for three months, and showed no more signs of malaria. Their physical condition improved considerably and they were all able to return to work. Five of these cases were examined 1½ years after treatment and proved to be in perfect health.

C. A. Hoare.

EUBANAS (Froilan). **Mercurochrome Soluble-220 in Malaria.**—*Jl. Philippine Islands Med Assoc.* 1926. July. Vol. 6. No. 7. pp. 215–218. [11 refs.]

Seven lepers, 5 with tertian and 2 with subtertian malaria parasites detected in the blood, were treated with mercurochrome soluble-220, five with 1 and two with 2 intravenous doses, usually of 3 mgm. each. Ill effects (chilliness, headache and slight fever appearing 2 to 6 hours after injection) were slight or absent, and at the same time malarial symptoms, such as fever, were apt to disappear, giving a suggestion of clinical cure. Parasites persisted, however, in all cases.

C. L.

ALVARADO (Ricardo) & ARROYABE (Vicente). Tratamiento de los vómitos de origen palúdico por la adrenalina. [**Treatment of Malarial Vomiting by Adrenalin.**]—*Bol. Inst. Clín. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. p. 111.

The writers have obtained immediate and certain results in malarial vomiting by 1 or 2 milligramme doses of adrenalin (this *Bulletin*, Vol. 23, p. 527). They attribute the condition to adrenal insufficiency and correlate it with cases of asthenia for which the blood condition does not account.

C. L.

LE ROY DES BARRES. Du traitement chirurgical des splénomégalies palustres non compliquées. [**Surgical Treatment of Uncomplicated Malarial Splenomegaly.**]—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 277–316. With 2 figs. on 1 plate. [45 refs.]

The writer is concerned with the excision of the simple malarial spleen, or of that accompanied by splenic anaemia. Surgical interference is held to be indicated if, after medical treatment properly carried out, the spleen is still of a "dangerous" size—that is, presents 3 finger-breadths below the costal margin, or is painful. A contraindication is myeloid leucaemia, and adhesions may render the operation impossible. For the operation very full details are given, its mortality in the writer's hands being 5 to 10 per cent. "The influence of splenectomy on the evolution of malaria is always favourable."

C. L.

LEITCH (J. Neil). **The Treatment of Malaria: a Plea for Isolation.** —*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 543–545. [2 refs.]

The line of argument is:—Gametocytes, the source of mosquito infection, do not develop until a week after fever begins; diagnosis is easy and positive; infection can only be transmitted by the anopheline mosquito, from which the patient can be completely isolated by screening; he can then be, in a relatively short time, cured of his malaria without possibility of relapse; and the cure can be confirmed by the microscope. [That the premises are not all correct in this case does not detract from the advisibility of screening the sick.]

C. L.

GIEMSA (G.), WEISE (W.) & TROPP (C.). Chemotherapeutische Studien mit Vogelmalaria (*Plasmodium praecox*). [**Chemotherapeutic Studies in Bird Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Aug. 1. Vol. 30. No. 8. pp. 334–347. [12 refs.]

The normal course of infection with *Plasmodium praecox* in 15 canaries is tabulated. The maximum infection shows itself about 10 days after inoculation; in 3 of the birds it persisted till, and apparently caused, death; in the other 12 it gradually lessened until no parasites could be found in the peripheral blood. In 3 cases quinine hydrochloride, and in other three aminohydroquinine, was injected into infected canaries on 4 consecutive days, the solution being of 1 per cent. strength and the quantities 0·3 cc. on the first day and 0·25 on the others. Neither drug disinfected, parasites appearing about 10 days after the cessation of injections of the drug (instead of 10 days after infection as in controls), but the blood infection when it showed itself was less severe. Of three cases similarly treated with cinchonine 1 died, 1 showed parasites equally throughout the treatment and subsequent observation period, and the last was free from them during treatment, but plasmodia appeared immediately afterwards and after 10 days increased in numbers.

It is concluded [it seems on uncertain grounds] that bird malaria forms a model means by which the chemotherapy of malaria can be studied and a table is inserted [whose + symbols are not those of previous tables and whose — ones mean "to" and not "minus"] in which effects of drugs on bird and human malaria are contrasted. The quinine molecule is then considered.

C. L.

MORGENROTH (J.), ABRAHAM (L.) & SCHNITZER (R.). Experimentelle Studien zur Malariabehandlung. [**Experimental Studies on Malaria Treatment.**]—*Deut. Med. Woch.* 1926. Aug. 27. Vol. 52. No. 35. pp. 1455–1457. [10 refs.]

The effects on canaries of quinine, hydroquinine and optochin are compared. The birds had injected into one breast 0·04 cc. of infected blood and into the other the drug, this treatment being continued for from 4 to 17 days. The dosage was 0·3 cc. of a 1 in 250 solution, except that, in the case of optochin the strength was sometimes 1 in 300. It is not easy, from the data given, to be satisfied that any treatment was essentially more effective than the others.

C. L.

BRÜNN (W.). Perorale Chininprophylaxe bei der Proteosomapraecox-Infektion. [**Quinine Prophylaxis per os in** *Proteosoma praecox* **Infection.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. June 7. Vol. 98. No. 7–8. pp. 507–513. [13 refs.]

Daily oral administration of 0·1 cc. of a 2 per cent. solution of hydrochloride of quinine to canaries infected with *P. praecox* holds off manifestations of malarial infection as long as the dosage is continued, and does not interfere with the subsequent establishment of natural immunity. The longer the administration is continued the lighter will be the subsequent manifestations, for the infection continues although no parasites are found in the peripheral blood, seeing that injection of the blood of the treated bird will induce infection in another canary.

C. L.

i. ROY (Anukul Chandra). **On the Estimation of Minute Quantities of Quinine in the Blood.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 129–133. [3 refs.]

ii. HATCHER (Robert A.) & WEISS (Soma). **Studies on Quinin.**—*Jl. Pharm. & Experim. Therap.* 1926. Oct. Vol. 29. No. 1. pp. 279–296. [17 refs.]

i. For the isolation of quinine from blood, the method described by ACTON and KING (this *Bulletin*, Vol. 20, p. 59) is used, but for the estimation of the recovered alkaloid the author employs, in place of Tanret's reagent, an acid solution of iodine, made by diluting 25 cc. of N/100 iodine solution to 250 cc. with N/100 hydrochloric acid.

With this reagent he claims to be able to estimate differences of 0·002 mgm. and 0·001 mgm. over concentration ranges of 0·045 to 0·03 mgm. and 0·03 to 0·001 mgm. respectively, in a total volume of 5 cc., whilst 0·0005 mgm. in 5 cc. or 0·0001 mgm. in 2 cc. can be detected, when matched against a blank.

ii. The authors find that quinine can be extracted almost quantitatively from defibrinated blood by simple agitation with chloroform. This method is not applicable to separated corpuscles or to tissues, and in these cases the material was dissolved in a 5 per cent. solution of caustic soda and the quinine then extracted by chloroform. The residual alkaloid left on removal of the solvent was dissolved in dilute acid, the solution filtered, if necessary, then made alkaline, and the alkaloid re-extracted and weighed, the weight so found being checked by titration of the residue with bromine water.

Using these methods, it was found that when quinine is added to cats' blood it is sometimes " fixed " by the corpuscles, so that it cannot be washed out by normal salt solution, but is still recoverable by shaking with chloroform. Injected intravenously into cats or dogs 95 per cent. of the alkaloid disappears from the blood within one to 5 minutes, but traces are discoverable in the case of the dog as much as 15 hours afterwards. The alkaloid is fixed by the capillaries immediately after intravenous injection, and they probably play an important part in returning it to the circulation. It is promptly fixed by the lungs, liver, heart, kidney and brain in higher concentration than the average for the remainder of the body, but is given up rapidly, so that after 3 hours scarcely any remains in any of these organs.

No explanation of the therapeutic action of quinine is based on these results, but it is suggested that the fixation by the capillaries leads to more intimate contact between the protozoa affected and the alkaloid.

T. A. Henry.

GROSSMANN (Ernst). Ueber die Adrenalinlymphozytose bei Malaria. **[Adrenalin Lymphocytosis in Malaria.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Nov. 1. Vol. 30. No. 11. pp. 684–701. [19 refs.]

One milligramme of synthetic adrenalin hydrochloride injected subcutaneously into each of 20 cases of malaria always resulted in a general leucocytosis including lymphocytosis. The maximum number of white corpuscles was reached in 10 to 40 minutes. The most striking rise was one in 10 minutes from 5,600 to 30,400 per cmm. At the height of this general rise the percentage of lymphocytes was, with one exception, always raised, the increase in actual numbers per cmm. varying between 920 and 10,314. If the absolute increase were less than 1,500 the reaction was described as negative, if over 2,500 as positive. Period of infection, species of malaria, age of patient, and size of spleen appeared to have no influence on this reaction.

C. L.

WIECHMANN (Ernst) & HORSTER (Hermann). Studien ueber experimentelle Infektionskrankheiten. II. Mitteilung. Physikalische und chemische Untersuchungen des Blutes bei der experimentellen Malariainfektion des Menschen (Ausgeführt mit Unterstützung der Rockefeller Foundation.). **[Chemical Examination of Blood in Experimental Malaria.]**—*Deut. Arch. f. Klin. Med.* 1926. Aug. Vol. 152. No. 3–4. pp. 136–152. With 1 curve. [28 refs.]

Between injection of infective malarial blood and the appearance of fever there occur, first a fall and then a rise in the protein content. With fever the protein again falls, but the chemical change precedes the febrile one; and is associated with an alteration in vascular tone. With convalescence the protein content again rises.

In the incubation period serum globulin is in excess, this excess disappearing during convalescence. Regarding serum albumin, in incubation it lessens, with the onset of fever it generally falls and does not increase immediately on disappearance of fever.

C. L.

MACIEL (Heraldo). A proposito de um caso de azotemia palustre. **[Increase of Blood Urea in Malaria.]**—*Sciencia Med.* 1926. Aug. 31. Vol. 4. No. 8. pp. 410–416. With 1 chart. [2 refs.]

In a man with aortic insufficiency, and with heart, as well as ascending transverse and descending aorta, dilated, the blood urea varied from

2·44 to 0·99 and 0·36 per thousand. *Plasmodium falciparum* was present without splenic or hepatic enlargement, headache, or large mononuclear increase, but with continuous fever lasting 17 days.

C. L.

RAÚL GOYENA (Juan). Las modificaciones de la fórmula leucocitaria y la imagen neutrófila de la sangre en las anemias palúdicas. [**Changes in the Leucocytes and in Arneth Count in Malarial Anaemia.**]—*Semana Méd.* 1926. Sept. 30. Vol. 33. No. 39 (1707). pp. 838–853.

In 76 cases, polymorph neutrophils generally constituted 20 to 60 per cent. of the leucocytes. Frequently there was no eosinophilia. Basophils were absent in 90 per cent. Lymphocytes commonly lay between 30 and 50 per cent. and large mononuclears between 5 and 20. Metamyelocytes were present in 46 cases. Arneth's counts gave :—Deviation to the left 59 per cent., to the right 36, no deviation 5.

C. L.

CALLANAN (J. C. J.). **A Side-Light on the Production of** *Plasmodium tenue* (**Stephens**).—*Kenya Med. Jl.* 1926. Oct. Vol. 3. No. 7. pp. 182–192. With 3 plates. [12 refs.]

When examining films containing "*tenue*" forms of *P. falciparum* Callanan noticed that they tended to preponderate in certain portions of the film, and he proceeded to determine whether he could produce them deliberately. He found that the rate of drying had no influence in the production of such forms, but that what he designated as "pressure" but which "is actually a combination of pressure, adhesion, surface tension, and possibly other physical and mechanical conditions," did have such influence. For example, in an area where erythrocytes were heavily superimposed, ring forms alone were present, whereas the same blood if so spread that it formed "a layer of single cells, for the most part in close opposition, forming a mosaic pattern" ring forms comprised 13 per cent. and tenue forms 87 per cent. Similarly fresh blood preparations showed no tenue forms. It is accordingly concluded, that "forms morphologically indistinguishable from those described as *Plasmodium tenue* may be produced simply by the factors involved in the process of smearing the blood on the slide, which are alluded to under the term "pressure."

[At a meeting of the Royal Society of Tropical Medicine and Hygiene held on 20th January, Professor J. W. W. STEPHENS, in Discussion, referred to this paper. He did not think that Dr. Callanan was dealing with *P. tenue*, since his figures were nothing like Professor STEPHENS' own specimens. He agreed that parasites at the edge of slides were often irregular in form when those in the centre were rings. This reference to *P. tenue* was provoked by Major SINTON's report that *tenue* forms were absent from the many thousands of cases he had examined in the Punjab, but present, as reported by himself and others, from areas, in India and elsewhere, in which blackwater fever existed.]

C. L.

PÉRÈKROPOFF (G. J.). Sur la question du développement atypique des parasites de la tierce bénigne. **[A typical Development of Parasites of Benign Tertian.]**—*Cent. f. Bakt.* I. Abt. Orig. 1926. July 6. Vol. 99. No. 1–3. pp. 115–129. With 48 figs. on 2 plates. [39 refs.]

Another of those curious cases is described in which smears show *tenue* or other bizarre forms as well as typical *P. vivax*. There are 48 figures in two plates, illustrating some of the changes seen. The writer is satisfied that he can distinguish from one another (from the period before penetration of the erythrocyte to that of full growth) the sexual and asexual forms and illustrates, without hesitation in identification, the division of microgametes into spores (p. 124, line 2). [These are indeed trying times for the male.]

C. L.

ANNECKE (S.). **The Relative Numbers of Male and Female Gametocytes in Human Malaria** (*Plasmodium vivax, Plasmodium falciparum* **and** *Plasmodium malariae*) **and** *Haemoproteus* **in Birds.**—*Proc. Roy. Soc. Med.* 1927. Jan. Vol. 20. No. 3. pp. 267–271. (Sect. Trop. Dis. & Parasit. pp. 1–5). [11 refs.]

After considering the findings of others, the writer notes, that his own observations are as follows :—

| | Male gametocytes. | Female. gametocytes. |
|---|---|---|
| *P. falciparum* ... ... | 1,085 | 3,591 |
| *P. vivax* ... ... ... | 172 | 437 |
| *P. malariae* ... ... ... | 55 | 221 |
| " *Haemoproteus* " ... ... | 784 | 1,178 |

C. L.

HEGNER (R. W.). **Asexual Reproduction without Loss of Vitality in Malarial Organisms.**—*Science.* 1926. May 7. Vol. 63. No. 1636. pp. 479–480. [4 refs.]

*Plasmodium praecox*, the parasite of bird malaria, has been propagated entirely without the mosquito in canaries in Baltimore and New York, in the latter place since 1913. In this case it is calculated that there have occurred 3,648 consecutive asexual generations. Taking the interval of sporulation and the virulence as indices of vitality, the strain is as potent as ever. It would have been interesting and valuable had the question of persistence of gametocytes been touched upon.

C. L.

YOSHINO (Masutaka). Ueber die Möglichkeit der Uebertragung menschlicher Malaria-plasmodien auf Versuchstiere. **[Possibility of Transmission of Malarial Plasmodia to Animals.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 9. pp. 624–626. With 16 text figs.

Yoshino claims that, injecting subcutaneously a large number of *young* guineapigs, rabbits and dogs with blood from a man with tertian malaria, he has found rings in the blood of the experimental animals, from the second to the eighth day. Gametes have not been seen, nor rings after the eighth day. Not only has he carried infection from man to guineapig, but from guineapig to guineapig, that is to say, in series of three hosts—man, guineapig, guineapig. The paper is illustrated by a plate of figures.

C. L.

HANSCHELL (H. M.). **Notes on Malaria in the Treatment of General Paralysis of the Insane.**—*Brit. Jl. Ven. Dis.* 1926. July. Vol. 2. No. 7. pp. 235–242. [26 refs.]

In this paper, with its fully acknowledged indebtedness to this *Bulletin*, the following facts are new or distinctively stressed :—The spontaneous disappearance in one case of fever and of parasites from the cutaneous blood for 3 days, both then reappearing and paroxysms becoming severer than ever ; a temperature of 107° F. in a sporozoit infection ; the need of relying not merely on the temperature chart and the blood for signs of danger to life, but of keeping a continuous clinical watch on the patient, particularly in the case of a man who is, as the patients concerned are, already necessarily damaged by syphilis; the onset of fever and reappearance of malaria parasites in cutaneous blood in " established " but latent cases of malaria treated with arsenobenzol and bismuth or mercury for concomitant syphilis, and the record that after injection of *P. vivax* into general paralytics the fever can be cut out by neosalvarsan in these not " established " cases. Lastly, there is the experience of relatives, who inquired threateningly (in a mosquito infected case) whether the patient's worsened condition was not due to his having been injected with insane syphilitic blood, and the comment that it is easier to use mosquito-sporozoite infection than to find a certificate of the tróphozoite-donor's moral and physical worth.

C. L.

i. DANTE (Ferraro). Come dobbiamo valutare nella pratica corrente (e militare) la terapia della paralisi progressiva, con la malaria inoculata. [**The Value of Malarial Therapy in General Paralysis.**] —*Ann. di Med. Nav. e Colon.* 1926. Sept.–Oct. Year 32. Vol. 2. No. 3–4. pp. 149–159. [29 refs.]

ii. BOSCH (Gonzalo) & Mó (Arturo). Malarioterapia y parálisis general progresiva. Tratamiento mixto.—*Semana Méd.* 1926. No. 4. Vol. 33. No. 44 (1712). pp. 1204–1209.

i. A neurological study collects from the literature the mental effects of treatment by malaria in 3,193 cases, although even then the English cases at least are not all reported. The percentage of complete remission was 30, of marked but incomplete remission 20, of slight improvement 20, of no change 20, while the percentage of deaths attributable to the malarial infection was 10.

ii. The corresponding figures in 50 cases here reported are :—returning to their profession 20, greatly improved 28, slightly improved 14, not improved 18, deaths (which are held not attributable to malaria) 6, still with active malaria 14.

C. L.

PLEHN. Die Malariabehandlung der progressiven Paralyse und der Tabes. [**Malaria Treatment of G.P. and Tabes.**]—*Deut. Med. Woch.* 1927. Jan. 1. Vol. 53. No. 1. pp. 7–9. [13 refs.]

The points of main malarial interest are the experience that the several strains used have not altered in virulence by their direct passages through man, and that it is not the case that a strain necessarily loses its gametes by such continual passages. Plehn again mentions the one which, after 2 years during which no gametes were detected, suddenly took to producing them, and 2 others which have persistently formed gametes. And there is this sentence, the mark of a man of courage: " moreover—one should be honest—it is almost impossible on purely morphological grounds to distinguish from a gamete a ripe tertian schizont about to sporulate." C. L.

CUBONI (E.) Gametenfreie *Plasmodium vivax*-Stämme. [**Gamete-Free Strains of** *P. vivax*.]—*Wien. Klin. Woch.* 1926. Dec. 16. Vol. 39. No. 51. pp. 1475–1476. [6 refs.]

DOERR and KIRSCHNER have shown that both the strains of *P. vivax* employed at Wagner-Jauregg's clinic were originally gamete-bearing. Now, after 143 and 134 direct passages, they are entirely without gametocytes. This has been determined in 50 blood examinations of 14 persons, each examination comprising examination of 4 thin and 2 thick preparations taken after the host had undergone 7 or 8 attacks of fever and at all periods of the cycle. In no case were schizonts so few as not to be detectable in a thin film. DIONISI'S theory is quoted:—that the sexual elements are predetermined in certain sporozoits in the mosquito, that they do not all develop at once, some lying low in internal organs, but that when they have done so the strain becomes gamete-free. C. L.

WAGNER-JAUREGG (Julius). Einige Bemerkungen ueber Impfmalaria. I. Ueber den Typus der Fieberanfälle. [**Remarks on Inoculation Malaria. I. The Type of Fever.**]—*Wien. Klin. Woch.* 1927. Jan. 6. Vol. 40. No. 1. pp. 26–27. [5 refs.]

The originator and most experienced observer of injected malaria begins a series of notes on that subject. Regarding the rhythm produced, he points out that if blood from the same man be injected into two others, one may have tertian and one quotidian attacks, and either kind may pass into the other or into a mixed type, while parasites may be present in the blood in all stages. Moreover, a strain which has passed through a number of human passages, giving in each a purely tertian fever, may suddenly alter and produce daily attacks. These characteristics have not been produced as a result of many direct passages, but have been present from the beginning. He refers to JAMES'S work, showing that parasites are present in all stages of growth in mosquito-borne malaria even when infection has been by a single mosquito biting once; and to his further observation, that in these natural cases there is a first stage of irregular fever as KORTEWEG indicated; in 80 per cent., a second quotidian stage; merging into a frankly tertian. In 10 per cent. the form of these mosquito infections was initially tertian and in 10 it began as tertian and became quotidian.

C. L.

DRIVER (J. R.); GAMMEL (John A.) & KARNOSH (L. J.). **Malaria Treatment of Central Nervous System Syphilis. Preliminary Observations.**—*Jl. Amer. Med. Assoc.* 1926. Nov. 27. Vol.87. No. 22. pp. 1821–1827. With 1 chart in text. [20 refs.]

The paper reports 79 cases of syphilis of the central nervous system treated by benign tertian malaria, which is described as asexual and which was passed on by intravenous injection of 2 to 8 cc. of blood. There were 6 " failures to inoculate," although 1 was successful on repetition. The indications for interrupting the malaria or, put otherwise, the signs held to be of grave malarial prognosis, were : (*a*) Blood urea of over 70 mgm. per 100 cc. ; all the cases showed evidence of severe toxaemia ; and all but one recovered on quinine administration, and he had had an increase of urea of 300 mgm. (*b*) Fall of systolic blood pressure below 95 between rigors, a fall below 90 being usually followed by collapse. (*c*) Severe icterus with an index above 50. (*d*) Red cell count below 2,000,000 or progressive anaemia without further rigors. (*e*) Profuse vomiting and diarrhoea. Stress is laid on the value of close clinical observation so that, with experience, " laboratory tests become of value chiefly as symptoms arise which indicate their use."

C. L.

O'LEARY (Paul A.), GOECKERMAN (William H.) & PARKER (Stephen T.). **Treatment of Neurosyphilis by Malaria. Further Observations.** —*Arch. Dermat. & Syph.* 1926. Nov. Vol. 14. No. 5. pp. 550–556. [7 refs.]

The cases considered number 100. In 2 the writers were " unable to produce malaria," that is presumably fever, since *P. vivax* was found in the blood of each of them for 3 weeks. In 2 others the " malaria " aborted after the fourth and sixth rigors. Successful inoculations were made from all 4. Reinoculation was unsuccessful in 5 instances, at intervals of 8 to 15 months after the first malarial course. There have been no deaths attributed to malaria.

C. L.

RUDOLF (G. de M.) & RAMSAY (J. C.). **Enumeration of Parasites in Therapeutic Malaria.**—*Jl. Trop. Med. & Hyg.* 1927. Jan. 1. Vol. 30. No. 1. pp. 1–8. With 14 charts. [8 refs.]

The number of parasites present in a given quantity of cutaneous blood has been enumerated in a series of cases of therapeutic malaria. In nearly every instance there were fewer half grown parasites found in the peripheral blood than there had been sporulating forms of the previous generation, and similarly there were usually many more older forms than there had been young ones. The last difference is held too great to be explicable on the supposition that it was merely due to the overlooking of young forms. The question of an internal habitat is considered. There is a tendency for gametocytes to vary in like proportion with asexual forms. In 5 out of 10 patients there was a relationship between the number of parasites and the degree of fever.

C. L.

NICOLE (J. Ernest) & STEEL (John P.). **Post-Malarial Condition of the Cerebro-Spinal Fluid in G.P.I.**—*Lancet.* 1926. June 5. pp. 1091–1092.

The authors in a former paper [*Lancet.* 1925. Oct. 31] had endeavoured to show that some alteration does actually take place in the cerebrospinal fluid after malaria therapy in G.P.I. The globulin content is much diminished, and Lange's colloidal gold test is less typically paretic than before treatment. Since then they have re-examined some of their recorded cases and also investigated others. The table (40 cases) accompanying this paper shows that the C.S.F. changes appear at the end of 12 months after malaria is terminated; that with still further lapse of time the change continues, and that the Lange reading becomes even more like a tabetic condition. The change usually begins at the paretic end of the curve. In some of their cases nothing higher than a " 2 " had been obtained in paretic, luetic, or meningeal fields. They emphasize the fact that diminution in the globulin content of the cerebrospinal fluid cannot be taken as a sign that the mental condition is improved; illustrative cases of this are quoted, as are others showing that one may, however, expect some improvement in health and habits with the coincident lessening of globulin, cells, and reducing power of the C.S.F. Furthermore, coincident increase of globulin, cells and reducing power, and steady physical deterioration, have been noted. A second series of malarial rigors had no quickening effect on the changes in the C.S.F.; nor did " 914 " therapy after the malarial pyrexia. They find in their series of cases no support for the thesis that the number of malarial rigors sustained has any effect on the C.S.F.

H. M. Hanschell.

SPIETHOFF (B.). Die Kupierung der Impfmalaria durch Salvarsan und Spirocid. [**Salvarsan and Spirocid as Abortives of Inoculation Malaria.**]—*Muench. Med. Woch.* 1926. Dec. 31. Vol. 73. No. 53. p. 2246.

The cure of inoculated malaria is held to be better effected by salvarsan and " spirocid " than by quinine, since the last is believed to have a greater weakening effect on a heart already handicapped by fever. If the fever be quotidian, 0·3 gm. of salvarsan (or 0·45 gm. of neosalvarsan) is injected on 2 consecutive days; if tertian, the interval is increased to 48 or 72 hours. " Spirocid " is given in 4 tablets (3 for a woman) repeated in 8 hours and thereafter daily for 7 days. There follows a 4 days pause and then a repetition of the treatment. No evidence is offered for any of the statements made.

C. L.

VOITEL (Karl Hermann). Ueber die Wirkung des Eosins bei der Abstellung der therapeutischen Impfmalaria. [**Action of Eosin in the Suppression of Therapeutic Malaria.**]—*Klin. Woch.* 1926. Nov. 5. Vol. 5. No. 45. pp. 2117-2118. [4 refs.]

In 20 cases 1 gm. of quinine was given by mouth, and 0·05 gm. eosin in normal saline was injected intramuscularly or subcutaneously. The results seem to have been much as if only quinine were injected. In 4 more of these deliberately infected cases there is said to have been qiniune resistance [all other writers have commented on the ease of disinfestation], in 2 the fever fell after two eosin injections, in 1 cellulitis resulted ; the fourth died. In 1 case reported, death is acknowledged to have resulted from pneumonia.

C. L.

BAKER (Geoffrey T.). **General Paralysis associated with Benign Tertian Malaria.** [Memoranda.]—*Brit. Med. Jl.* 1926. Oct. 16. p. 685,

——. **A Case of General Paralysis with Benign Tertian Malaria.**—*Lancet.* 1926. Oct. 30. p. 903.

A man with a history of malaria and of heat stroke and with a completely positive Wassermann reaction was admitted to the Kent County Mental Hospital in January, 1926, confused, disorientated, wet, dirty, hallucinated and restless. In August he had 2 bouts of tertian fever and benign tertian parasites were found in the blood. After 17 rigors, quinine treatment was begun, but he died on September 6th without mental improvement. General paralysis occurred then, in spite of " malaria of long standing " and " a further severe relapse of malaria in no way hindered the progress of the cerebral condition to a fatal termination." The date of the original malaria is unnoted, nor is it indicated whether other general paralytics were undergoing malaria treatment in the hospital at the time.

C. L.

BERING (Fr.). Die Behandlung der Tabes mit Malaria. [**The Malarial Treatment of Tabes.**]—*Deut. Med. Woch.* 1926. Sept. 17. Vol. 52. No. 38. pp. 1611–1613.

62 cases seem to have been treated with three deaths, 1 after taking " Albert 102," 1 from multiple renal abscess and 1 after 4 malarial attacks without distinct rigors and with the temperature only twice reaching 40° C.

C. L.

MURATOWA (A.). Ueber atypische Schizogenien bei Impfmalaria. [**Atypical Schizogony in Inoculation Malaria.**]—*Arch. Russes de Protistologie.* 1925. Vol. 4. No. 1–2. German summary pp. 73–74. With 6 figs. on 1 coloured plate. [In Russian pp. 67–73. 8 refs.]

Pointing out that the biological effects of passing malaria parasites from man to man by injection have been imperfectly studied, Muratowa describes a case of *P. vivax* infection so induced in which double and triple infections of a single corpuscle with rings were not uncommon and infections with a macrogamete and a ring sometimes seen. Yet other appearances, however, he holds to be schizogony of a macrogamete. The evidence offered that it was a macrogamete is the presence of pigment in rodlets and the absence of a vacuole. The absence of visible division between the dividing body and what he calls the "reduction" part, with the carrying of the dividing nuclei into the latter ; the absence of male gamete characters ; and the degenerate and vacuolated character of the " reduction " body are his reasons for excluding a double infection in these instances. The German summary contains no information as to the mode of preparation, which was presumably the usual thin smear.

C. L.

LENZMANN (R.). Ueber Behandlung der chronischen Gonorrhoe durch Malariaübertragung. **[Treatment of Chronic Gonorrhœa by Malaria Inoculation.]**—*Deut. Med. Woch.* 1926. Sept. 17. Vol. 52. No. 38. pp. 1608–1610.

Noting that concomitant gonorrhoea was bettered in syphilitics undergoing malaria treatment, Lenzmann infected with malaria 73 subjects with gonorrhoea, 68 women and 5 men. All 5 men and 53 (78 per cent.) of the women were cured. The malaria followed the usual course, and was treated by a complicated course of quinine.

C. L.

GAMBLE (Clarence J.). **Failure of Therapeutic Malaria in Treatment of Leukemia.**—*Jl. Amer. Med. Assoc.* 1927. Jan. 8. Vol. 88. No. 2. pp. 87–90. With 4 charts in text. [7 refs.]

Infection was obtained in two cases, one myelogenous, 1 lymphatic, by intramuscular injection of 5 cc. of malarial blood taken during a paroxysm. There was a great decrease of leucocytes continuing so long as paroxysms lasted, but the leucocytes approximated to their previous level 3 and 6 days after termination of malarial paroxysms by quinine.

C. L.

SCHUMACHER (Josef). **Nonspecific Stimulation Therapy, Wassermann Reaction and Syphilis Therapy with Living (Malaria) and Dead Lipoid-Albumin Compounds. (A Contribution to the Mode of Action of Antisyphilitic Remedies).**—*Amer. Jl. Syph.* 1926. July. Vol. 10. No. 3. pp. 432–438. [4 refs.]

" The *mode of action of malaria therapy*, according to our present investigations, is based upon the extensive destruction of red blood corpuscles and other tissue cells (spleen, etc.), through the infection, with the resulting development of *autogenous lipoid-albumin compounds*, which occur in a similar way, following the syphilitic infection of a tissue. These lipoid-albumins also act as an antigen in this case, the symptoms of the defensive activity of the system being expressed by an *increased production of lipoproteolytic ferments*. It is to the action of these ferments that those spirochetes succumb which are located in the brain and cord, and which are otherwise out of our reach."

C. L.

DONATH (Julius) & HEILIG (Robert). Zur Wirkungsweise der Impfmalaria. **[Action of Therapeutic Malaria.]**—*Wien. Klin. Woch.* 1926. Mar. 25. Vol. 39. No. 13. pp. 353–355. [19 refs.]

Their previous investigations concerning the behaviour of amino-N. in the blood in artificially induced fever (produced by such agents as milk, typhoid vaccine, trypsin and colloidal sulphur in man, and nucleic acid in animals) showed that at the height of the action of these bodies there was a rise of body temperature accompanied by a regular and considerable increase of amino-acids in the blood. Whereas, in cases of general paralysis of the insane and in Parkinsonism following encephalitis lethargica treated by artificially induced malaria, there was no increase in the amino-acid content of the blood.

They reasoned that the amino-N. increase in the blood has a double origin, in part proteid disintegration at diseased foci (focal reaction), and partly proteid disintegration throughout the body (general reaction). If the reaction is general, the amino-N. increases in the blood, but if focal it increases locally, for example, in the cerebrospinal fluid.

Working on this hypothesis amino-N estimations of the cerebrospinal fluid were carried out by the Von Slyke method at the height of the fever produced by the injections of typhoid vaccine, milk, and the parasites of malaria and recurrent fever. The results showed that the greatest increase of amino-N content in the cerebrospinal fluid occurred in artificially induced malaria, was less in induced recurrent fever and after typhoid vaccination, and that there was no increase after milk injection.

From this they infer that in recurrent fever and after typhoid vaccine there is a general reaction with increase of amino-acid in the blood and a certain diffusion of these acids into the cerebrospinal fluid, whereas in induced malaria there is no general reaction and no increase in the amino-acid content of the blood, but there is a focal reaction in the central nervous system, as is shown by the increase in the cerebrospinal fluid. Similar results as regards the amino-N content of the blood were obtained by F. Wagner in his investigations with naturally acquired tertian malaria and recurrent fever.

They conclude that this conception of the focal reaction, especially in the central nervous system, in artificially induced malaria coincides with the views of Nonne, Strausler, and Koskinds as regards the therapeutic action of the malarial parasite in the treatment of general paralysis. This theory is further supported by histological evidence of focal inflammatory areas in the brains of paralytics dying whilst under this treatment, and clinically by certain physical states and attacks of pain observed in the course of a malarial cure.

H. Whittingham.

Serio (Francesco). Tentativi terapeutici con l'inoculazione sperimentale della malaria. [**Therapeutic Tests with Experimentally Inoculated Malaria.**]—*Policlinico.* Sez. Prat. 1926. Oct. 25. Vol. 33. No. 43. pp. 1490–1493. [7 refs.]

Three cases are described in which malaria was deliberately injected subcutaneously, two held to be tertian and the other quartan. In the last the possibility of a mixed tertian and quartan infection seems possible from the course of the fever. The features of malarial interest were the irregularity of the fever, the practical absence of gametocytes and the susceptibility of the parasites to quinine.

C. L.

Oudendal (A. J. F.). **Enquiry into Spleen-Palpation, based on the Weight, Situation, Shape and Dimensions of the Enlarged Spleen in Post Mortem.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp.235–248. With 31 figs. on 13 plates.

This is essentially a record of post-mortem examinations. After death in adult male Javanese, in whom the suprasternal notch and the symphysis pubis are separated by the same distance, the positions of the nipples, navel and rib margins do not correspond when transferred to a chart. The same holds for living boys between 8 and 12. Equally, there is no relationship after death between the weight, length, and marginal thickness of the spleen, and, of course, no correlation with its consistence. All these points are held to be important in spleen palpation.

C. L.

FAJARDO (Jacobo), LOPEZ-RIZAL (Leoncio) & PADUA (Regino G.). **A Study on the Determination of Spleen Index in Filipino School Children.**— *Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 249–269. With 4 charts.

PADUA (Regino G.). **Further Studies on the Index Line in Malarial Splenomegaly.**—*Jl. Philippine Islands Med. Assoc.* 1926. Mar. Vol. 6. No. 3. pp. 77–83. [3 refs.]

It may be remembered that at the 4th Congress of the Far Eastern Association of Tropical Medicine the best means, for international use, of measuring the amount of splenic enlargement was considered, and that CHRISTOPHERS, with and without the co-operation of KAZAN, considered the matter with exactitude, concluding that during splenic enlargement the splenic apex so rarely deviated from its normal route that it could be mapped on a standard abdominal chart, worked out for a sitting height of 60 cm., by measurement of its distance from the umbilicus corrected by a Table (this *Bulletin.* Vol. 21, p. 597). As the basis of his measurement KUNO selected the clavicle-iliac line, lying between the top of the sterno-clavicular joint and the anterior superior iliac spine of the same side. In the first paper now reviewed, the conclusion is reached that the clavicle-iliac line is a satisfactory base line, and in the second that the mid-clavicular line is equally satisfactory.

C. L.

BARRETO (João de Barros) & DE ALMEIDA (Egydio). Malaria e habitação. Fundamentos da lucta em domicilio contra os anaphelineos adultos, particularmente pelos expurgos periodicos. [**Domiciliary Measures against Anopheles Adults.**]—*Sciencia Med.* 1926. Nov. 30. Vol. 4. No. 11. pp. 577–587.

The importance of house infection in malaria which has recently been stressed by the League of Nations Malaria Commission, and particularly by JAMES, is emphasized by a number of quotations from authorities. The position is described thus :—The species of anopheles which prefer human habitations are those recognized as being of the greatest importance in the conveyance of malaria. They have a tendency to return to the same house or to a neighbouring one and are apt to be naturally infected. There is apt to be a parallelism between anopheline density and malaria in houses, and more than one case is likely to occur in the same house. Consequently, there should be intensive and persistent domiciliary warfare against anopheles.

C. L.

GIOSEFFI (M.). Le " Gambusie " nella lotta antimalarica in Istria. [**Employ of Gambusia for the Control of Malaria in Istria.**]—*Riv. di Malariologia.* 1926. July–Aug. Vol. 5. No. 4. pp. 469–475. [8 refs.] [English summary p. 552.]

Gambusia imported from America by the good offices of the U.S. Fishery Board have shown up to the present in Istria that they are an effective and economic means of larval control ; they withstood the heat of summer, as they did the cold of winter of 1925–26 ; from the waters where they were introduced they have made the larvae of the anopheles practically disappear. Gioseffi credits them with a beneficent action on the endemic malaria (disappearance of primary cases in a zone of 1,360 inhabitants under his control.)

C. L.

ÁLVAREZ (Washington). Paludismo y gestacioñ.—*Semana Méd.* 1926. Dec. 9. Vol. 33. No. 49 (1717). pp. 1561–1564.

ASCOLI (Vittorio). La terapéutica específica del paludismo.—*Siglo Méd.* 1926. Aug. 21. Year 73. Vol. 78. No. 3793. pp. 162–166.

BARD (Leopoldo). El paludismo. Un factor de despoblación.—*Repert. de Med. y Cirug.* Bogota. 1926. Aug. Vol. 16. No. 11 (203). pp. 642–648.

BRAS DE SÁ (L. J.). Malaria no Concelho de Satari.—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. pp. 326–335. With 4 figs.

DELAMARE (G.). Tierce bénigne chez une femme enceinte (nombreuses plasmodies anormales).—*Ann. de Méd.* 1926. Mar. Vol. 19. No. 3. pp. 289–300. With 1 text fig. [3 refs.]

HOUSSIAU (F.). Barême des invalidités en ce qui concerne la palidisme et les maladies exotiques.—*Bruxelles Méd.* 1926. Aug. 15 & 22. Vol. 6. Nos. 41–42 & 43. pp. mclxxxvi–mcxc ; mccxvi–mccxx.

KING (W. V.) & BRADLEY (G. H.). Airplane Dusting in the Control of Malaria Mosquitoes.—*Jl. Trop. Med. & Hyg.* 1926. Sept. 15. Vol. 29. No. 18. pp. 311–313. With 8 text figs. [*v. Bull. of Hyg.* Vol. 2. p. 66].

KONDO (Kiichi). [Malarial Hemolytic Jaundice.]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1925. Nov. No. 2446. [Summarized in *Japan Med. World.* 1926. Feb. 15. Vol. 6. No. 2. p. 42.]

DE LANGEN (C. D.). Studies concerning the Relation of the Malarial Parasite to the Erythrocyte.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 17–25. [*v.* this *Bulletin,* Vol. 23. p. 821.]

MENDEL (Kurt). Epilepsie und Malaria.—*Med. Klin.* 1926. Nov. 12. Vol. 22. No. 46 (1144). pp. 1770–1771.

MORGENROTH (J.), ABRAHAM (L.) & SCHNITZER (R.). Experimentelle Studien zur Malariabehandlung.—*Deut. Med. Woch.* 1926. Aug. 27. Vol. 52. No. 35. pp. 1455–1457. [10 refs.]

MORISHITA (Kaoru). Note on the Natural Enemies of Mosquitoes, and their Significance in Malaria Control.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. Aug. No. 257. English summary p. 5. [In Japanese.]

REGA (Michele). Un caso d'infezione mista (Simbiosi) tifo-malarica.—*Riforma Med.* 1926. Dec. 20. Vol. 42. No. 51. pp. 1220–1221.

SENIOR-WHITE (Ronald). Some Ideas engendered by Recent Work on Malaria.—*Indian Med. Gaz.* 1926. Sept. Vol. 61. No. 9. pp. 456–458 [*v.* this *Bulletin,* Vol. 23. p. 804].

SERGENT (Et.) & CATANEI (A.). Résultats obtenus par l'administration de faibles doses quotidiennes de quinine, de cinchonidine ou de cinchonine aux indigènes paludéens en Algérie.—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 35–48. With 3 graphs in text. [4 refs.] [*v.* this *Bulletin,* Vol. 23, p. 548].

WEISS (E.). Unübertragbarkeit der Impfmalaria durch Anophelen.—*Wien. Klin. Woch.* 1926. Dec. 23. Vol. 39. No. 52. pp. 1507–1508.

ZAMBRANO (José M.). Esterilización del hombre enfermo. Quininización y otros medios.—*Semana Méd.* 1926. Aug. 19. Vol. 33. No. 33 (1701). pp. 475–479.

# PELLAGRA

SUTTON (Irwin C.). **Pellagra.**—*Amer. Jl. Med. Sci.* 1926. Sept. Vol. 172. No. 3. (No. 654). pp. 374–382. With 4 figs. [12 refs.]

The author's observations are based upon the study of a series of pellagra cases numbering in all 56. No mention is made of where these cases occurred, but it may be assumed that the locality was California. The previous diet of the patients is not discussed, except to say that, in many instances it was "high-protein." Three types of the disease are described—early cases with trivial symptoms, severe cases with marked symptoms and cases in which the pellagra condition is overshadowed by some complication. Five examples are given illustrating these types.

Of the 56 cases, 30 were females and 26 males. The youngest patient was 6½ years, the oldest 67. The total number of deaths in the series was 11, 3 of these from cancer. Only eight of the cases were admitted to hospital.

The clinical and laboratory findings are discussed under the headings of the systems involved, but nothing striking or unusual is to be noted. The same is true of the necropsy findings in 5 cases.

Under the heading "differential diagnosis" means of distinguishing pellagra from other diseases are suggested. The diagnosis may be confused with that of pernicious anaemia, lupus erythematosus, dermatitis venenata, erythema solare, trichophytosis and acrodermatitis chronica atrophicans.

The treatment of those patients admitted to hospital consisted in abrupt change of diet to one of high protein and vitamin content. Hourly feeds of whole oranges, including seeds and rind, and boiled beef steak were instituted. The ambulatory patients were treated by a gradual change of diet. Mercury and arsenic in some form were used as an adjuvant to the above treatment both in hospital and in ambulatory cases. Intestinal parasites when present must be dealt with, and pellagra was found to be no bar to surgical procedures when these were necessary. The ambulatory cases seemed to progress more favourably than those in hospital.

The author concludes that "pellagra is probably not a simple deficiency disease like beriberi or scurvy" and that "while the causative agent may not be known it is probably of an infectious nature and gives rise to a substance which sensitizes the patient to sunlight."

A. D. Bigland.

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ITOH (Minoru). Ueber Pellagra in Japan. [**Pellagra in Japan.**]—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 315–333.

Records of 12 cases showing erythema of the hands with other symptoms are given. From the description of the rash, from the history of the onset (always in spring or summer), from the diarrhoea (5 cases), from the stomatitis (4 cases), from the psychic changes (2 cases), from the dysesthesia (9 cases) and from the paretic ataxia (7 cases) the diagnosis is almost certainly pellagra.

Examination of the blood revealed slight anaemia in 5, a relative lymphocytosis in 6 and increased sedimentation in 5. The Wassermann reaction was positive in 3 cases and the von Pirquet in 2.

Eight of the cases were treated with an extract of rice husk. As a result, symptoms began to lessen almost at once and in a few months all traces of the disease had disappeared without relapse.

A survey of all hitherto reported cases of pellagra in Japan is undertaken. The total number is 60. These were found everywhere in the main island (Honshu) and also in Korea and Formosa. Practically no cases occurred on the north island. In no instance was there any family history of the disease. The ratio of male to female incidence was 41 to 16 and the ages varied from 21 to 60. Those attacked by the disease were chiefly ill-nourished workmen living upon a diet of polished rice. Diarrhoea occurred in 27 cases and 18 showed stomatitis and indicanuria. Eight patients presented pellagra psychosis and many more had peripheral neuritis, which in 19 closely resembled beriberi.

Thirty-two out of 37 cases had a negative Wassermann reaction and 8 out of 32 showed a positive von Pirquet. The disease runs a very chronic course and the mortality is 27 per cent.

Post-mortem findings include catarrh and ulceration of the gastro-intestinal tract, degeneration and atrophy of the organs and fatty degeneration and atrophy in the cerebral cortex and spinal cord. Four cases were complicated with phthisis and 3 with emphysema.

The author concludes that pellagra is an avitaminosis. He quotes the work of others in favour of this view and remarks that all but one of his cases lived upon polished rice. Treatment with rice husk extract is strongly advised.

A. D. B.

SHELLEY (Horace M.). **Observations on Pellagra in Nyasaland.**—*Lancet.* 1927. Jan. 8. pp. 74–75. With 2 diagrams.

The observations made by the author in this paper are apparently the same as those made by him in the *Nyasaland Protectorate Ann. Med. Rep.* 1924, and in the *Kenya Medical Journal,* 1925, Vol. 2, No. 8. An abstract of this work will be found in this *Bulletin,* Vol. 23, p. 685.

A. D. B.

STANNUS (Hugh S.). **Pellagra in Nyasaland.** [Correspondence.]—*Lancet.* 1927. Jan. 15. pp. 156–157. [3 refs.]

Dr. Stannus in this letter replies to some observations made by Dr. H. M. SHELLEY in the paper cited above. The writer points out that in his already published work it is clearly stated that cases of pellagra occurred not only in the Central Gaol, but also among the general population of Nyasaland. He mentions that post-mortem specimens from 9 cases were sent to Dr. Kinnier WILSON, who published a report in 1914 dealing chiefly with the neurological findings. Chronic diffuse degeneration involving practically the whole of the central nervous system was observed, and it seemed probable that these changes were produced by a toxin " entering the theca by the lymphatic spaces of the posterior roots."

The writer does not agree that the dermatitis of pellagra is the result of a neuritis affecting particular nerves. He is of the opinion that the action of the sun's rays is the only cause of the particular distribution of the rash and that the areas involved do not strictly correspond with those of either nerve roots or peripheral nerves.

Similar disagreement is recorded with the view that there are true resemblances between pellagra and myxoedema and with the statement that deficient thyroid secretion is an essential factor in pellagra.

A. D. B.

VISWALINGAM (A.). **Pellagra in the Malay States, its Etiology and Treatment.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 307–314. With 4 plates.

Pellagra was first recognized in the Malay States by the author in 1917. The first case occurred in the State of Perak, but since then the disease has been observed in other States and in the Central Mental Hospital.

Etiological factors are discussed. So far the disease has only been noted among Chinese labourers engaged in the tin mines, rubber plantations, etc. The work is particularly strenuous and the diet is both monotonous and deficient in protein and also in fat-soluble and water-soluble vitamins. Clothing, soil and housing are apparently unimportant factors. Under these adverse conditions it is not surprising that beriberi, dysentery, malaria, ankylostomiasis, etc., are also present and play their part in debilitating the worker.

Three typical cases are described in some detail and the author gives his views regarding etiology and treatment. " Prolonged faulty diet is not in itself a cause of pellagra, though it may be the chief determining factor. An unhealthy gut mucosa appears to be essential. It favours the absorption of toxic products from the contents of the intestine, thereby producing that intoxication of the tissues which is the real cause."

Correcting intestinal stasis, when present, by surgical means and the administration of vitamin extracts are successful methods of treatment.

A. D. B.

LOPEZ PRIOR (Andrés). Un foco de pelagra en Caldas de Reyes, provincia de Pontevedra. [**A Centre of Pellagra in Caldas de Reyes, Province of Pontevedra.**]—*Bol. Técnico de la Dirección General de Sanidad.* Madrid. 1926. Vol. 1. No. 4. pp. 273–280. With 2 coloured plates.

In the course of his visits as Health Officer the author studied 49 cases of pellagra in the district of Caldas de Reyes, and it is probable that there were some 100 pellagrins in this small area. More than half the patients were over 50 years of age ; 94 per cent. were labourers, and women were attacked more than men, in a proportion of 3 to 2.

Several cases might occur in a family, but there was no evidence of hereditary transmission, and the fact could be explained by exposure to a common source, though it would appear that some members of a family were more susceptible than others. A large proportion of the patients lived in a state of poverty and under insanitary conditions. The food was largely maize bread mixed with rye, but the author, from examination of the food question, did not find much support for a food-deficiency theory of causation. Again, though Stomoxys and Simuliidae were frequent all over the Province, they were not more numerous in Caldas de Reyes than in parts where there was little or no pellagra. The paper is illustrated by an excellent coloured plate of the hand of a pellagrin in an advanced stage of the disease.

H. Harold Scott.

ARZT (Leopold). Ueber versprengte Pellagra im neuen Oesterreich. [**Sporadic Pellagra in Post-War Austria.**]—*Wien. Klin. Woch.* 1926. Sept. 16. Vol. 39. No. 38. pp. 1057–1058. [7 refs.]

Three sporadic cases of pellagra occurring in New or post-war Austria are described. All 3 were females, and all appeared to have had an alcoholic tendency. The first one was the first case described in pre-war Austria by MERK. Though her rash was first noticed in 1911, she was admitted to a skin clinic again in 1925 and therefore appears in this series. The rash in all 3 cases first showed itself in April, May or June. No definite treatment was given and all recovered

[The only interesting point in these cases is the alcoholic history. Alcoholism without doubt with its resulting loss of appetite is equivalent in effect to a food deficiency.]

A. D. B.

DAVIE (T. M.). **A Case of Pellagra.**—*Jl. Mental Sci.* 1926. Apr. Vol. 72. No. 297. pp. 211–214. [2 refs.]

The patient, a male, had the following history: –He had worked for over 20 years as a maltman in a brewery. He was in the habit of chewing barley and occasionally also maize. Apparently, many years before his attack of pellagra developed he had given up his work and with it his chewing habits. He always had a poor appetite and his diet was deficient, especially in respect of animal protein.

In November 1923 he began to present mental symptoms, and after a sojourn in the Edinburgh Royal Infirmary he was admitted in February 1924 to Morningside Asylum. The patient was kept on the verandah. Soon his mental confusion improved, but great depression took its place. In August 1924 the pellagrous eruption was first noted. He was treated with Bovril, cod-liver oil, fruit and green vegetables, and by November the pigmentation had practically disappeared. Some rigidity of the legs was present and diarrhoea occurred in attacks towards the end of the year. Blood examinations showed a slight anaemia and a relative lymphocytosis. Dr. SUSMAN reported that the red cells " showed in many cases definite, well defined, colourless, homogeneous areas of degeneration." There was some renal inadequacy as revealed by the phenolsulphonephthalein test. In June 1925 a small ulcer appeared on the tongue. Later this proved to be an epithelioma and not long afterwards the patient died of bronchopneumonia.

The author concludes by stating that in 1921 4 cases of pellagra were treated at Morningside and another 4 cases in 1924.

A. D. B.

LEWIS (Edward). **Pellagra: Report of a Case in a Child aged Seventeen Months.**—*Amer. Jl. Dis. Children.* 1926. Aug. Vol. 32. No. 2. pp. 226–231. With 7 text figs.

A typical case of pellagra exhibiting the rash, sore tongue, diarrhoea, etc., is described in a coloured boy aged 20 months. The disease is relatively infrequent in the District of Columbia, where the child lived, and it is rare under the age of 2 years. Apparently the condition had been present for about 3 months before admission to hospital. The child had been breast-fed exclusively up to the age of 6 months and his diet since had been fairly good, except for a complete absence of cows' milk and vegetables.

In addition to pellagra, rickets was present, together with symptoms suggestive of beriberi and scurvy.

Treatment was as follows :—The child was given 1 gm. of yeast vitamin powder (Harris) in 1 teaspoonful of water t.d.s., together with fresh cows' milk, expressed beef juice and orange juice. Later cereal jelly, " scraped beef cake " and cod-liver oil were added and the yeast vitamin powder supplanted by " commercial yeast cake." Later still, vegetables were included in the diet. Improvement was rapid and he increased about 40 per cent. in weight during his stay in hospital.

The sporadic nature of the disease together with the associated conditions suggest to the author that the pellagra in this case was probably due to faulty diet.

The very clear photographs of the case together with the fact that Dr. GOLDBERGER himself saw the child leave no doubt as to the correctness of the diagnosis.

A. D. B.

GOLDBERGER (Joseph). **The Present Status of our Knowledge of the Etiology of Pellagra.**—*Medicine.* 1926. May. Vol. 5. No. 2. pp. 79–104. With 5 charts. [67 refs.]

There is no new work described in this lecture, but the author gives a very full account of the arguments in favour of the faulty diet etiology of pellagra. Goldberger states that if this view be correct 4 implications, which the hypothesis carries with it, must also be true. These are (1) that a difference between the diet of pellagrins and non-pellagrins must be demonstrated. (2) That the disease must be curable by proper diet. (3) That it must be preventable by this diet. (4) That the disease must be experimentally produced by diet.

These 4 " implications " are thoroughly investigated and the rôle of P—P factor in pellagra is demonstrated.

A. D. B.

FAUST-NEWTON (Cosette). **Dietary Factor in Treatment and Prevention of Pellagra, with Particular Reference to Yeast.**—*Southern Med. Jl.* 1926. Mar. Vol. 19. No. 3. pp. 168–175. With 2 charts in text. [75 refs.]

This paper was read before the Medical Section of the Southern Medical Association at the 19th annual meeting, held at Dallas, Texas, in November 1925. The treatment of the subject is largely a recapitulation of already published work.

The author concludes, after a study of the evidence, that it is definitely established that the dietary factor is by far the most important one in the causation of pellagra ; that the taking of sufficient Vitamin B, or possibly the unknown P—P vitamin, is essential ; and that dried brewers' yeast is almost a specific for the disease.

With these conclusions it is suggested that an active educational campaign should be instituted in pellagrous districts, and that a series of accurate records of the results following the propagation of the above views should be kept for a period of at least 5 years.

Charts are presented showing how closely pellagra incidence coincides with general economic conditions.

A. D. B.

KARCZAG (L.). Zur Biologie und Klinik der Pellagra. [**Biology and Symptoms of Pellagra.**]—*Wien. Klin. Woch.* 1926. Dec. 9. Vol. 39. No. 50. pp. 1449–1451.

In the opinion of the author, acute pellagra as it occurs in guineapigs fed with maize differs from the human disease.

Experiments are described dealing with three groups of guineapigs having 10 members in each group.

*Group* 1. Tuberculous guineapigs fed on ordinary diet.

*Group* 2. Maize fed guineapigs.

*Group* 3. Controls.

It was found that in Group 2 alopecia, herpetic eruptions, diarrhoea and a paralysis of the hind legs occurred. One animal showed erythema.

In Group 1 paralytic symptoms were also found to occur and alopecia seemed to be present in any animal which was under-fed and, therefore, cannot be regarded necessarily as a pellagra symptom. Herpetic eruptions only occurred in the maize-fed animals.

From these experiments, the author concludes, the disease in maize-fed guineapigs has no analogy with human pellagra.

Post-mortem examinations of some of these animals revealed haemorrhages in the suprarenals and the work of others is quoted to show that in human pellagra a similar finding has been recorded.

The conclusion reached is that pellagra results from the chronic action of a toxin upon the chromaffin system and possibly upon other endocrine organs.

A. D. B.

SERBINOV (I. L.). [**On the Present State of the Question of "Pellagra" in Relation to the Theory of Maize "White Mould".**]—*La Defense des Plantes.* Leningrad. 1926. Vol. 2. No. 7. pp. 546–556. With 6 figs. [Summarized in *Rev. Applied Mycology.* 1926. Dec. Vol. 5. Pt. 12. pp. 733–734.

Since 1915 the author has been studying the white mould of maize, which is widespread in Bessarabia and in some parts of South Russia. In all samples in addition to *Oospora verticillioides* a bacterium resembling *B. lactis aceti* was found. It is, however, distinct from this and is named *Micrococcus zeae.* The organism is gram positive and a facultative aerobe. It is very resistant to desiccation and is carried by the insect *Opatrum intermedium.* It appears that *M. zeae* was always present in the diseased maize, while *O. verticillioides* was not found in a fairly large number of cases. This suggests that the former is the real cause of the disease. Guineapigs fed with this diseased maize invariably died in 5 to 7 days with Coli-typhoid symptoms. This, too, the author believes is due to *M. zeae.*

For the control of this disease of maize it is recommended to steep the maize seed in 4 per cent. formaldehyde, to use local maize varieties said to be resistant to the disease, and to destroy insect vectors.

A. D. B.

GUTHRIE (J. Birney). **Pellagra—Hydrochloric Acid in the Stomach Contents.**—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 357–365. [11 refs.]

After a critical survey of the literature dealing with gastric acidity in pellagra the author proceeds to discuss his own series of cases, consisting of 35 female coloured pellagrins. The average age was 32·8 years and the average duration of treatment in hospital was 47·7 days.

In this series 5·8 per cent. had excessive or normal free HCl in the stomach, 31·4 per cent. were deficient in this respect and in 62·8 per cent. there was complete achlorhydria. In the author's table comparing his results with those of other workers the only remarkable difference is in the figure 5·8 per cent. for those with normal or excessive HCl. This is a very much lower reading than elsewhere recorded.

In 19 fatal cases one had normal or increased HCl, 3 were deficient and in 6 there was achlorhydria. The author judges from these results that the presence or absence of free HCl in the gastric contents of pellagrins is of no prognostic value. Nevertheless, he considers that a diminishing acid content is of bad import, while the converse is also true. In diagnosis achlorhydria is of some help and a normal HCl content in a doubtful case is somewhat against a diagnosis of pellagra.

Though diarrhoea itself lowers gastric acidity there were a number of cases in the series which had severe diarrhoea with HCl in the stomach. Out of 93 pellagrins, 76·3 per cent. had diarrhoea previous to admission or during their stay in hospital.

The author advises the giving of HCl as a therapeutic measure in those cases in which the administration does not cause pain.

A. D. B.

MACHWILADSE (Niko). [Material zum Studium der morphologischen Veranderungen des Blutes bei Pellagra.] [**Morphological Changes in the Blood in Pellagra.**] 123 pp. With 3 photos & 1 map appended. [In Georgian.] 1925. [Summarized in *Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Nov. 1. Vol. 30. No. 11. pp. 708–710.]

Forty-six cases of pellagra occurring in Tiflis are made the subject of an exhaustive haematological study.

Thirty-nine of the cases were uncomplicated, while 6 had malaria and 1 phthisis. The blood examinations were made when the disease was at its height as evidenced by the presence of dermatitis, diarrhoea and dementia.

The results of the examinations may be given in brief as follows :—

1. *R.B.C's.*—Always reduced in number. Degree of anaemia not dependent upon length of illness, but upon severity.
2. *Haemoglobin.*—Diminished in 84 per cent. Normal in 16 per cent.
3. *Colour Index.*— 72 per cent. of cases greater than 1.
25 per cent. normal.
3 per cent. less than 1.
4. *W.B.C's.*— 64 per cent. less than normal.
23 per cent. just below normal.
13 per cent. normal.
5. *Platelets.*— 76 per cent. diminished.
24 per cent. normal.

6. *Neutrophil count.*—
(*a*) *Relative* 67 per cent. diminished.
33 per cent. normal.
(*b*) *Absolute* 92 per cent. diminished.
8 per cent. normal.

7. *Lymphocytes.*—
(*a*) *Relative* 72 per cent. increased.
26 per cent. normal.
2 per cent. diminished.
(*b*) *Absolute* 67 per cent. normal
28 per cent. diminished.
5 per cent. increased (slight).

8. *Eosinophils* mostly normal, when anaemia is very profound a complete absence. Increased only when intestinal parasites are present.

9. *Basophils.*—Normal. 7 per cent. of cases show slight increase.

10. "*Monocytes.*"— 5 per cent. normal.
13 per cent. slight increase.
2 per cent. diminished.

11. The *Arneth Count* shows a movement to the left in 95 per cent. of cases.

12. The R.B.C.'s stain well, megalocytes occur sometimes. Polychromatophilia—rare.

From these findings, amongst others, the author concludes that a toxin is present in pellagra acting upon the blood forming organs.

A. D. B.

BALLIF (L.), RENNESCU (N.) & REZNIC (A.). Contribution à l'étude du sang dans la pellagre. [**Study of the Blood in Pellagra.**]—*C. R. Soc. Biol.* 1926. Dec. 31. Vol 95. No. 38. pp. 1565–1567. [1 ref.]

Observations upon the blood in pellagra were made at the Socola Hospital (Rumania). The total albumen in the serum was determined in 60 cases (40 men and 20 women). The general average was 7·3 per cent., the normal being 7 per cent. Many cases showed a subnormal figure and others were much above the average.

A normal viscosity was found in 27 cases. In 4 it was slightly diminished and in 3 slightly increased.

The ratio between globulin and albumen was found to be normal in 14 cases only, being diminished in 7 cases and increased in 13. It is to be remarked, that the normal ratio $\frac{\text{globulin}}{\text{albumen}}$ is $\frac{20}{80}$ — $\frac{40}{60}$. In some cases these figures were inverted, $\frac{62}{38}$ in one case.

In serious cases the greatest modifications were found. Side by side with the diminution of albumen in the serum there was an increase in the chlorides and urea. As the case improved the chlorides and urea returned to normal, followed much later by the albumen. In severe chronic cases the albumen content was normal or increased and the chlorides normal.

Work is quoted to show that globulin increase in the serum is an expression of a metabolic imbalance or possibly of an endocrine imbalance. The authors are of the opinion that the variation in pellagra between globulin and albumen in the serum, together with the increase of chlorides and urea in the blood, are the result of tissue destruction and general intoxication.

A. D. B.

MOURIQUAND (Georges). Les diéto-toxiques. [**Diet-Toxins.**]—*Presse Méd.* 1926. May 1. Vol. 34. No. 35. p. 545.

Since 1913 the author has been engaged in researches upon diet deficiency and its results. In the course of this work he has recorded the following curious experiments:—1. Working with WEILL, it was found that feeding guineapigs upon whole barley resulted in typical scurvy. If the same barley was allowed to germinate and the animals were fed exclusively on the resulting growth, sudden death occurred or an illness which was manifested by convulsions or diarrhoea, ending fatally on the third to sixth day. It is obvious, therefore, that both of these diets are harmful. Now if the animals are fed upon both the above diets at the same time no ill results took place and normal growth was obtained.

2. Working with MICHEL the author fed guineapigs upon a diet partially deficient in vitamin C, but otherwise well balanced (barley, hay and sterilized lemon juice). The animals began to show signs of scurvy about the 80th day. Incidentally, it should be mentioned that the hay was found by control experiments to have no antiscorbutic power. Extraordinary to relate, omitting the hay from the diet caused scurvy to appear much earlier, i.e., on the 30th to 35th day. More extraordinary still, the readmission of hay to the diet cured the disease.

3. Guineapigs fed upon maize, hay and raw lemon juice remained normal. Subtract the hay from the diet and on about the 20th day the hair begins to fall off from half to three-quarters of the skin surface. This does not occur when barley is used in place of maize. In other words, the toxicity of maize only shows itself in the presence of an unbalanced diet. Restore the diet to its original equilibrium and the loss of hair ceases in less than 20 days. A similar phenomenon is said to be present in those pellagra cases where maize is supposed to be the cause of the disease.

4. The author, with MICHEL, has shown that if cod-liver oil be added to the balanced diet of guineapigs no trouble results, but if the diet is then rendered deficient grave bony changes occur, i.e., spontaneous fractures, haemorrhages, etc. Recovery was obtained by returning to the balanced diet still including the cod-liver oil. It was shown that the unbalanced diet by itself did not cause the osseous changes; therefore it would seem that cod-liver oil in the presence of an unbalanced diet becomes possessed of a powerful osteo-dystrophic power.

From a consideration of these remarkable findings it appears that certain substances, alimentary or otherwise, without toxicity under normal dietetic conditions, reveal their latent toxicity when the diet becomes deficient or ill balanced. They are not "true toxins" but "conditional toxins." To these the author gives the name "dietotoxins."

[After this work has received confirmation, it should throw much light on the connexion of these toxins with such a disease as pellagra.]

A. D. B.

VOLPINO (G.) La Pellagra ed il Maidismo. A proposito delle vedute del Prof. Mouriquand. [**Pellagra and Maize. On the Views of Professor Mouriquand.**]—*Riforma Med.* 1926. June 14. Vol. 42. No. 24. pp. 565–566; also in *Ann. d'Igiene.* 1926. June. Vol. 36. No. 6. pp. 462–465.

Pellagra is regarded as an intoxication, due to or aided by the production in the body of a special hypersensitiveness to maize. This is shown by the fact, that when pellagrins are inoculated with a small quantity of maize-extract, there results a reaction evidenced by fever, somnolence and perhaps delirium. This is not seen in pellagrins who have recovered and, if found in healthy subjects, the reaction is but slight and in no way comparable with that referred to above.

Again, in the serum of pellagrins ferments from disintegration of maize are said to be present and such serum is found to be toxic to guineapigs deprived of maize. But maize does not contain poisons in the strict sense, because when taken with other food, maize is harmless. Further, the condition produced is not a real anaphylaxis; there is, it is true, a " change of reactivity," but no explosive anaphylactic shock. The condition thus holds a position intermediate between toxicity on the one hand and alimentary anaphylaxis on the other—there is no proof of deficiency or avitaminosis, nor of a true special toxicity, but there are indications of sensitization.

The author fed guineapigs on maize exclusively for several days; after this, to some was given, in addition, the husk of the maize, to others a lipoid extract, to a third group the maize alone. The first 2 showed the " typical signs " early and in a marked degree and died much sooner than the third group. To prove that the bran and the extract were not themselves toxic, one of these was given together with green food to each of 2 more groups; both remained well and thrived.

As regards MOURIQUAND'S theory of diet-toxicity, it is stated, in connexion with the above, that barley is a scurvy-producing food and barley-grass toxic, but the 2 together are wholesome; also cod-liver oil is well borne by guineapigs with a balanced diet, but with a badly-balanced diet becomes toxic and leads to haemorrhages and dystrophy of bone. By itself, it has no such effect. MOURIQUAND, on the contrary, maintains that an ill-balanced diet may render manifest the toxicity latent in certain substances, to which a properly balanced diet acts as an antidote.

H. Harold Scott.

## YAWS AND SYPHILIS.

LOPEZ-RIZAL (Leoncio), GUTIERREZ (Perfectuo) & FERNANDEZ (Lorenzo). **A Field Experiment in the Control of Yaws.**—*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 431–441. With 1 text fig. [3 refs.]

For the purpose of investigating the feasibility of carrying out an anti-yaws campaign, a dispensary was opened in 1921 at the town of Parañaque, where some 24 per 1,000 of the population were affected. The town lies about 6 kilometres from Manila where, however, yaws is rare, although the conditions in the two places are similar, a point which remains unexplained. At a house to house canvass and in the three subsequent months it was considered that all the cases (a total of 244) of yaws had been brought under treatment, but new cases continued to turn up and it was found unwise to close the dispensary for a number of months each year as it had been hoped to do. In the three years to October, 1924, 1,151 cases (552 primary and secondary: 599 tertiary) of residents and 1,392 (630 primary and secondary: 762 tertiary) of non-residents were treated; the commonest tertiary lesions being keratosis palmaris et plantaris, and bone changes. Treatment was by means of neosalvarsan 0·01 gm. per kilo body weight, 1, 2 and in a few 3 injections being given, but in a group of 319 cases followed up [the actual period is not stated] 94·35 per cent. are stated to have recovered [presumably clinical cure.]

From April to July 31, 1925, 34 new cases were treated; this, in spite of the fact, that six months previously no cases were known to exist in the town—a point worthy of note in connexion with anti-yaws work. The authors emphasize the necessity for intensive treatment and persistent vigilance, and deprecate the intermittent operation of yaws dispensaries. In 1923–24 a total of 31,040 cases of yaws has been treated in the various provinces of the Philippines.

H. S. Stannus.

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NAVARRO (Regino J.). **A Serological Estimate of the Efficacy of Neosalvarsan in the Treatment of Yaws in a Field Dispensary.**—*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 445–452. [2 refs.]

Wassermann reactions were carried out in 101 cases in the granulomatous stage from among those dealt with in the previous paper, 3 months to 3½ years after the cessation of treatment by neosalvarsan. The reaction is presumed to have been positive before treatment of the 101 patients. 82 per cent. gave a negative reaction, of whom 51 per cent. had only received a single injection. 55 of the 101 only received 1 injection; of these 43 were negative. Of the 18 patients giving a positive W.R., 7 showed clinical manifestations of yaws. In this connexion, the author refers to GOODPASTURE and DE LEON, who found "that in patients under treatment with neosalvarsan, the Wassermann reaction did not disappear coincidently with the healing of the skin lesions . . . after the cessation of treatment the reaction gradually weakened and eventually became negative."

H. S. S.

LACY (George Rufus) & SELLARDS (Andrew Watson). **Investigation of Immunity in Yaws.**—*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 453–462. With 4 figs. on 1 plate. [3 refs.]

The authors give the following summary :—

" Four yaws patients were treated with neosalvarsan and, after an interval of about six months, they were inoculated with yaws. One developed a characteristic granuloma, and the others showed atypical results. Treatment with neosalvarsan was repeated in two of these cases and in the other two the lesions soon disappeared spontaneously. After more than two years these four patients were found to be free from any clinical signs or symptoms of yaws and the Wassermann reaction was negative. They were then reinoculated with yaws, and only one developed a typical granuloma, the same one who was susceptible in the previous test. At the time of the first course of treatment with neosalvarsan this patient had had yaws for only three months ; the others had been infected for much longer periods. Therefore, three of these four patients showed well-marked resistance to reinfection with yaws. This resistance to reinfection might be explained either by the development of an active immunity or by the continuance of a latent infection with yaws. In the absence of information permitting a final decision, we have adopted as a working basis the view that active immunity develops late in the secondary stage of yaws.

" It is of considerable practical significance that yaws patients, treated in the advanced secondary stage of infection, have remained in excellent health, free from any symptoms of yaws, and that they retained well-marked resistance to reinfection for more than two years. This period of time is ample to permit bringing the disease under control even in heavily infected districts."

It should be added that of the four cases reinoculated with yaws a second time on October 1, 1924, and who then all showed negative W.R. three, namely the case which became infected (November 29, 1924), a case which showed no lesion (April 30, 1925), a case with abortive atypical reaction (April 30, 1925) gave positive W.R.s on dates as above while the fourth case with similar reactions to the third was negative (June 30, 1925).

H. S. S.

SELLARDS (Andrew Watson), LACY (George Rufus) & SCHÖBL (Otto). **Superinfection in Yaws.**—*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 463–474. With 22 figs. on 6 plates. [14 refs.]

The authors set out to contrive a series of experiments to demonstrate whether superinfection in yaws is possible or not, and find that their results demonstrate a difference in this respect between yaws and syphilis. They quote NEISSER, who states, " that if a normal person were to be inoculated with syphilis every day, say, for one month, the first 10 or 15 inoculations would give rise to entirely typical primary chancres, but the subsequent inoculations would produce only abortive atypical reactions, or might even give entirely negative results "—in other words, superinfection in syphilis can not be effected. The same has been found true by previous authors in regard to yaws except CHARLOUIS, whose experiments are not, however, altogether free from challenge.

Sellards and his colleagues in their experiments produced yaws by inoculation in six volunteers, who had never lived in a yaws district, in whom there was no suspicion of syphilis and whose W.R.s were negative. They were all—cases A to F— inoculated on January 17th, 1925, with the production of a primary yaw yielding treponemata in 3½, 3½, 4, 4 and 4 weeks respectively; F giving an atypical reaction. In the following table, condensed from the tables given in the paper, these points will be seen.

| (1) Case No. | (2) Interval in weeks between first inoculation and formation of primary yaw. | (3) Interval between first and second inoculations. | (4) Interval between first and second inoculation and formation of primary yaw. | (5) Interval between first inoculation and formation of primary yaw of superinfecting inoculation. | (6) Interval between first inoculation and appearance of secondary lesion. | (7) Character of lesion after reinoculation on same arm as first inoculation. | (8) Character of lesion after reinoculation on opposite arm. |
|---|---|---|---|---|---|---|---|
| A ... | 3·5 | 4 | 3·5 | 7·5 | 10 | Granuloma coalescing with primary yaw of first inoculation | small granuloma |
| B ... | 3·5 | 4 | 3·5 | 7·5 | 10 | granuloma | small papule |
| C ... | 4 | 5 | 6 | 11 | 11 | small papule | minute granuloma |
| D ... | 4 | 5 | 4·5 | 9·5 | 10·5 | as in A | typical small granuloma |
| E ... | 4 | 6 | 5 | 11 | 10·5 | cluster papules | typical granuloma |
| F ... | + | 6 | — | + | 15·5 | negative | negative |

The incubation period was thus 3½–4 weeks up to the time of the formation of a lesion, which could be called a typical primary yaw, though slight changes in the healed skin were manifest from the 10th day onwards, except in case F in which regression took place. Following reinoculation, at intervals shown in table, the first 5 patients developed clinical manifestations identical with those produced by the first inoculation. In 4 of the 5 these appeared in 4–7 days (in 1st inoculation only after 10 days) with the formation of granulomata or papules in due course. In the reinoculations, 2 incisions were made in each case, 1 on the same arm near the primary yaw of the original inoculation, the other on the opposite arm ; the results at the time that treatment was begun are shown in the table. In the sixth case, in which for a short time after the first inoculation, a small nodule could be felt, 4 weeks later complete regression had taken place. Reinoculation gave entirely negative result, but 11 weeks after inoculation the W.R. was ++ and superficial lymph glands were enlarged and there had appeared macular lesions on the palms and small papules on the hairy part of the neck, containing treponemata. All the cases except F developed typical secondary lesions [distribution not mentioned] ; they differed in no way from the primary lesions. The number of weeks elapsing between 1st inoculation and development of secondary rash is shown in column (6) of table. This may be compared with column (5), which gives the number of weeks elapsing between 1st inoculation and development of reinoculation primary yaw. The author believes that these results show that, " in contrast to syphilis, superinfection in yaws is possible, even after the typical primary granuloma has developed." [Further experimental work would appear necessary before this point may be looked upon as established. Much depends on the definition of superinfection, and the difference in the reaction in syphilis and yaws may be one rather of degree than of kind. A point that has also to be remembered is, that probably as in syphilis, trauma may determine the appearance of a lesion. In these cases, the reinoculation might merely have the effect of determining the appearance of a secondary yaw at the point injected.]

Other points of interest in the paper include observations on the W.R. in these cases. In 8 weeks after inoculation it was moderately positive, the titre thereafter increasing rapidly. Adenitis was present in all 6 cases studied, the axillary glands of the inoculated arm becoming palpable in 6–7 weeks ; subsequently many other superficial groups of glands became affected, more extensively than ordinarily found in syphilis. These subsided slowly under treatment. No rise of temperature was seen in any case. Case F is of interest in that generalized yaws appeared without a typical primary lesion having developed. This possibility is, one believes, well recognized, but not emphasized —" the tenor of the literature leaning towards the view that yaws, at least as it occurs spontaneously, is regularly initiated by the development of a primary lesion," according to the authors. Referring to the primary lesion, Sellards and his colleagues say, " such a granuloma bears no resemblance to the usual text-book description of the typical primary ulcer of yaws." [This erroneous description of the primary lesion as an ulcer in certain text books has already been pointed out in these columns. The same is, of course, true of the primary lesion in syphilis, which, properly speaking, is a granuloma, may be so small as to miss being seen, may show an abrasion of surface or may have the appearance of an ulcer if grafted on to a chancroid or if secondarily infected.]

H. S. S.

SCHÖBL (Otto), SELLARDS (Andrew Watson) & LACY (George Rufus). **Some Protean Manifestations of the Skin Lesions of Yaws.**—*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 475–481. With 3 plates. [8 refs.]

In this paper are described more fully three atypical skin manifestations in yaws patients, who are the subjects referred to in previous papers. They are (1) a lichenoid eruption surrounding the point of inoculation or reinoculation, (2) a circular exfoliative maculo-squamous exanthem on the palms, (3) a keratoid exanthem of the trunk and extremities. The first occurred, either as the sole reaction to inoculation, as in two treated cases inoculated two years later and case F, or surrounding a primary yaw as in case D, and a treated case inoculated two years later. The second was observed in case F, and closely resembled the well known lesion due to syphilis, here excluded by the conditions of the experiment. Subsequently, among 33 naturally infected persons, two other similar cases were seen. [The authors are apparently unfamiliar with this condition and speculate as to whether this lesion is later followed by the affection called "clavos"—"in some cases of which only greatly thickened layers of exfoliating epidermis are seen with no trace whatever of the original granulomata." They do not, it would seem, distinguish between keratosis palmaris, to describe the condition above mentioned, one which most tropical practitioners, conversant with yaws, would associate with the macular framboeside, and true clavus which as the authors say, meaning nail-hole, relates to the holes left by the shedding of hardened plugs resulting from dried up granulomata most commonly seen on the soles of the feet.]

The third condition to be described, keratoid exanthem of the trunk and extremities, is again one that those familiar with yaws will at once recognize when they look at the beautiful photograph reproduced. To quote the author's description—

> "The lesions were circinate, varying in diameter from 1 to 3 centimetres, and they were slightly hyperaemic at the margin. They were rough on palpation and were rendered prominent to the eye by the very distinct, white papillae that stood erect like goose flesh. This effect became more pronounced when a physiological goose flesh was induced by exposure of the patient's body to a cool breeze. The individual efflorescences of which such macular lesions are composed remind one of keratosis pilaris. As in keratosis pilaris, they are numerous and are small, conical, follicular papules of white colour located over the trunk and the extensor surfaces of the extremities. In the case under discussion there was no itching, but the depigmentation of the entire area, which involved the hair of the skin, was much more pronounced than in keratosis pilaris. There was no desquamation and the lesions were not diffuse, but were arranged in multiple, distinct, sharply outlined patches."

[The authors then go on to quote conditions described by SCHÜFFNER in Sumatra, BAERMANN and GUTIERREZ and believe that they are identical with that produced experimentally, but this is doubtful as certainly one of the affections mentioned by the last writer was the condition first described by ZIEMANN under "Melung" and referred to the macular depigmented exanthem commonly limited to the hands, wrists, feet and ankles. The various skin manifestations of yaws are, it is true, not yet definitely recognized, but most people will hardly agree with the authors who in their enthusiasm state at the end of their paper that "The skin manifestations of *T. pertenue* are almost as varied as are those produced by *T. pallidum*." Further, they would appear to suggest that the processes underlying the several types of skin lesion in yaws are different in nature, an hypothesis which only histopathological study will decide.]

H. S. S.

Keratoid exanthem of trunk and extremities occurring in a Yaws patient.

[Reproduced from the *Philippine Journal of Science.*]

SCHÖBL (Otto) & RAMIREZ (José). **The Globulin Precipitation Reaction in Yaws. Its Independence of the Wassermann Reaction and its Behavior during the Course and Treatment of the Disease.** —*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 483-496. [8 refs.]

While carrying out investigations with this test among lepers it was noted that a very marked reaction took place in a patient who had had yaws. The authors therefore decided to try out the test in 24 cases of pure yaws at the same time the W.R.'s were done. As in leprosy, there was reason to believe that this non-specific serological reaction did not run parallel with the W.R. The author's conclusions are as follows:—

"1. The globulin precipitation test with distilled water was found positive in at least a 1 : 3 dilution in every one of the 24 active yaws patients examined. In certain cases the reaction was very strong, inasmuch as precipitation occurred in as low a dilution as 1 : 1.

"2. Healed cases of yaws showed less-pronounced precipitation than did the active cases, but a good many still gave positive reactions.

"3. Both qualitatively and quantitatively the results of this test and of the Wassermann reaction did not always agree.

"4. Experimental evidence is produced that the globulin of the patient's serum which precipitates upon dilution with distilled water is not the carrier of the Wassermann antibody.

"5. The globulin precipitation reaction with distilled water becomes positive shortly after the infection with *Treponema pertenue* sets in and is pronounced in the "pre-Wassermann" stage. It maintains its strength throughout the course of the disease and is still positive long after the Wassermann reaction becomes negative through specific treatment. As a prodromal and anamnestic reaction in yaws the globulin precipitation reaction is more sensitive than is the Wassermann reaction.

"6. The practical value of the globulin precipitation reaction as a confirmatory test of clinical diagnosis of yaws in the pre-Wassermann stage and as a useful reaction for the guidance of the extent of specific treatment necessary in a given case of yaws is strongly indicated.

"7. Due to the simplicity of technic, the reaction under discussion may prove to be of value in anti-yaws campaigns in locations where conditions make the carrying out of the Wassermann reaction impracticable."

H. S. S.

LOPEZ-RIZAL (Leoncio) & SELLARDS (Andrew Watson). **A Clinical Modification of Yaws observed in Patients living in Mountainous Districts.**—*Philippine Jl. Sci.* 1926. Aug. Vol. 30. No. 4. pp. 497–507. With 9 figs. on 2 plates. [8 refs.]

In this paper the authors describe as "a modification of yaws" among the Malay population at Ifugoa, in the mountains of northern Luzon in the Philippines, a condition wherein the patients showed lesions resembling syphilitic condylomata of the muco-cutaneous junctures around the mouth, the nose, the anus and the genitalia to the exclusion of more generalized eruptions; only 5 of 33 cases examined "showed any evidence of metastatic involvement of the skin in areas more or less remote from the muco-cutaneous lesions." One had a few papules on the bridge of the nose; a second, granulomata in one axilla; a third, macular lesions on the palms; a fourth, papules over the eyebrow and on the scalp; a fifth, two granulomata on one forearm, one on the shoulder and several on the palms.

With this tendency to limitation of skin lesions there is, however, no restriction of enlargement of lymphatic glands. This limitation of the eruption is believed to be owing to the cooler climate due to elevation.

[Similar cases have previously been reported by SELLARDS and noticed in this *Bulletin*, but the hypothesis now put forward, that " a special strain of yaws of low dermatropic affinity has developed in these tribes in Ifugao, cut off for centuries from communication with the outside world," seems unnecessary, and, as he says, "at present there is no evidence to support such a supposition." The authors go on to remark: " We have not yet been able to perform the obvious and apparently simple experiment of inducing some of these patients in the early stage of the disease to leave the mountains and live for a few weeks in the lowlands."

Various observers are quoted as having demonstrated that yaws occurs among populations living up to altitudes of 5,000 ft, but no mention is made of the observations of RAMSAY in Assam (this *Bulletin*, Vol. 23, p. 8), who demonstrated that the hill dwellers who showed similar restricted exanthem in higher altitudes developed florid yaws when they came down to the plain.]

H. S. S.

JOLLY (G. G.). **The Occurrence and Distribution of Yaws in Burma.** —*Indian Med. Gaz.* 1926. Dec. Vol. 61. No. 12. pp. 581–585. With 1 map. [10 refs.]

Major Jolly in the present article has collected together all the information available as to the distribution of yaws in Burma. He shows that present knowledge of the disease in that country " is very sketchy and needs much amplification," and anything like systematic treatment has not been begun. He believes that yaws must have existed in Burma probably for centuries. With regard to the local name of the disease, he says that the word *buena* mentioned by CASTELLANI really indicates ringworm, and that in parts of Burma where the disease is in evidence the word used is *kwe-na* and *kwe-yoga* (Upper Burma). In Lower Burma the common name is *toungoo-na* and among the Salon tribe *paw-lwai*. The author also makes an interesting allusion to the word yaws.

> " There is in what is now the Pakokku district, a tract of land known as the ' Yaw ' country, which in the time of the Burmese kings was ruled by a ' Wun ' and known as the Wunship of Yaw-Le-Myo. It is bounded on the north by the Gangaw township of the Lower Chindwin, and on the west by the Chin Hills, both districts in which we know yaws to be very common. The Yaw country was and is inhabited by a people known as ' Yaws,' supposed to be descended originally from the Shans who founded the kingdom of Assam, and although it is probably a coincidence, one wonders whether there could possibly be any historical connection between the name ' Yaws ' by which the disease is usually known in the British Colonies, and this district of ' Yaw ' near the heart of Burma's principal endemic area, in which the disease still persists."

H. S. S.

MOUCHET (R.). **Yaws and Syphilis among Natives in the Belgian Congo.**—*Kenya Med. Jl.* 1926. Dec. Vol. 3. No. 9. pp. 242–245.

An article in general terms containing nothing new, except the suggestion that cases of juxta-articular nodules reported from Morocco and Algeria are in reality due to yaws imported by Senegalese troops. [All the evidence given by writers from North Africa is against this supposition, which would also not account for cases occurring in Europe.]

H. S. S.

GOODMAN (Herman). **Frambesia Tropica and Syphilis.**—*Porto Rico Health Review.* 1926. Vol. 1. p. 3. [Abstract in *Amer. Jl. Syph.* 1926. Oct. Vol. 10. No. 4. pp. 646–647.]

After referring to the theories which have been put forward to explain the different geographical distribution of yaws and syphilis and at the same time their possible relationship to each other, the author suggests that the cross immunization obtained with the two diseases using monkeys for the experiments gives presumptive proof that the specific organisms of yaws and syphilis are not identical to-day.

H. S. S.

JAHNEL (Franz) & LANGE (Johannes). Zur Kenntnis der Framboesie-Immunität der Paralytiker. [**Immunity of the General Paralytic to Yaws.**]—*Klin. Woch.* 1926. Nov. 5. Vol. 5. No. 45. pp. 2118–2119. [4 refs.]

Following on their previous experiments in which they failed to infect general paralytics with yaws using a strain carried in rabbits supplied by NICHOLS, the authors repeated their experiments, using a second strain placed at their disposal by Dr. Louise PEARCE of the New York Rockefeller Institute, a strain of central American origin, obtained from a negro woman patient of Dr. Howard FOX, of which the reactions in rabbits had been studied by PEARCE AND BROWN.

Eight cases of G.P.I. proved refractory to this strain of yaws virus (known as $Y^2$) with a similar result in a single case of tabes. In a case of cerebral syphilis an uncharacteristic lesion developed at the site of inoculation, which retrogressed and failed to yield spirochaetes, a result which must be considered negative. The objection that might be made against these experiments, namely, that long passage through rabbits might have diminished the pathogenicity of the strain for other animals, including man, is met by the fact that the first strain not kept in rabbits was also noninfective for G.P.I. cases. In cases of disseminated sclerosis used as non-syphilitic controls infection was easily effected by skin scarification method, but the induced disease had no therapeutic effect on the nervous lesions. The non-infectability of cases of G.P.I. by yaws virus must be considered as an immunity phenomenon.

Similar results have since been obtained by the use of a third strain of East Indian origin.

H. S. S.

SABRAZES (J.). Le spirochète du pian (*Spirochaeta pertenuis*) ; sa coloration. [**Staining the Yaws Spirochaete.**]—*C. R. Acad. Sci.* 1927. Jan. 4. Vol. 184. No. 1. pp. 47–48. With 1 text fig. [1 ref.]

The author reports his observations on methods of staining *Spirochaeta pertenuis* obtained from two cases of yaws. No staining was obtained with methylene and carbol toluidine blue, but by Ziehl-Neelsen method good results were produced, and by this method together with the procedure of Fontana-Tribondeau still better.

H. S. S.

McNaughton (J. G.). **The Relation of Goundou and Yaws.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. p. 310.

The author gives a brief note of a second case of goundou following closely on yaws met with in the anti-yaws campaign in East Africa. A boy, aged 10 years, had typical paranasal swellings. He suffered from yaws, untreated, two years ago, the swellings appearing a year later. Neither he nor his father and brother, who both had yaws, showed any manifestations of syphilis.

H. S. S.

Moore (G. D. Fitzgerald). **Case of Goundou.**—*Nigeria Ann. Med. & San. Rep.* 1925. Appendix D. p. 58. With 1 fig.

Dr. Moore puts on record a typical case of goundou occurring in a boy [aged 7 years judging from the photograph], who at the same time showed "sabre tibiae," serpiginous yaws ulceration and nodes and complained of nocturnal bone pain. The paranasal tumours were removed by operation and the general condition improved after a long course of salvarsan.

H. S. S.

Armstrong (John S.). **Notes on the Treatment of Yaws (Framboesia Tropica) in Western Samoa.**—*Mandated Territory of Western Samoa. Ann. Rep. Dept. of Health for the Year ended 31st March, 1926.* Appendix B. pp. 17–19. [2 refs.]

The anti-yaws campaign started in 1923 in Western Samoa, entailing the administration of three injections of N.A.B. at weekly intervals to the whole yaws-sick population each year by medical units which visit all the villages in each district, was continued during the past year, and the results are here reported. One district was selected as a control district in which details of all cases were kept, thus serving as a basis upon which results in other districts might be integrated and going to show whether those results were such as might have been anticipated. [A very important point worthy of adoption in all native countries where similar campaigns are being conducted.]

The total numbers of injections given in the three years 1923–24–25 were 36,304–17,282–11,500, and it is stated that 61 per cent. of the population of 35,000 in Western Samoa has been treated. Other figures show the interesting result that in the 2nd year there were 3,695 fresh cases and 2,066 relapse cases, in the 3rd year there were 1,878 fresh cases and 1,955 relapse cases. The large number of relapses is stated to be accounted for by the fact that many in the first year did not receive a full 3 doses and others only smaller doses on account of the presence of some intercurrent disease. No children under six months old showed yaws lesions, but none by the age of 24 months was free.

The author is one of those who believe that one attack of yaws confers immunity against any subsequent attack of yaws or syphilis, and thinks that the treatment being given in no way disturbs such immunity, but that it is likely to do so if treatment be given to children with the primary lesion before the body has had time to develop its natural immunity. [These are interesting speculations, which may or may not receive support during the next ten years.] No case of a primary sore or generalized eruption was seen in a Samoan over 10 years of age, except in the case of nursing mothers, who sometimes showed an ulceration about the nipple, which the author regards as " a purely local infection of the tissue due to frequent massive infection of a wound with organisms from the lesion of the baby."

H. S. S.

MOSS (W. L.). **Yaws. Results of Neosalvarsan Therapy after Five Years.**—*Ann. Trop. Med. & Parasit.* 1926. Dec. 17. Vol. 20. No. 4. pp. 365–384.

In 1920 the author together with SELLARDS and BIGELOW visited Santo Domingo as a commission to study yaws; the results of their observations were published in the *Johns Hopkins Hospital Bull.,* 1922 [see this *Bulletin,* Vol. 20, p. 172]. In 1925 he revisited the country to observe the results of treatment given on the former visit. Of the 1,046 cases studied on that occasion the author had the opportunity of making further observations in 1925 on 419. Among these were 276 cases on whom observations had been made in 1920 subsequent to treatment; 33 per cent. then were noted as clinical cures, and 67 per cent. uncured. In 1925, of the whole series of 419, 46·5 per cent. remained uncured five years after treatment, and 53·5 per cent. had remained free of signs of yaws during the five years.

The paper is a long one, with many tables analysing a mass of figures which it is impossible to summarize, and should be read by those interested in the subject. The following points may be noted, however. Results suggest that about 50 per cent. of a miscellaneous series of yaws cases in various stages may be cured by a single injection of neosalvarsan (0·6 gm.), that the percentage of cures is not much increased by two injections, but is consideably increased by three injections. The W.R. in 1925 on 73 cases treated in 1920 gave a positive result in 29, doubtful in 11, and negative in 33. The earlier the stage of the disease the more amenable it is to treatment. An interesting table is given in support of the view held as to the sequence in development of the various lesions in yaws:—

| | No. of cases. | Average age. | Average duration. |
|---|---|---|---|
| Primary lesion ... ... | 15 | 6·6 years | 2·3 months |
| Early florid secondary eruption ... ... ... | 82 | 8·8 ,, | 12·3 ,, |
| Sparse recurring late secondary lesions ... ... ... | 60 | 9·3 ,, | 29·6 ,, |
| Late lesions on soles ... ... | 327 | 21·6 ,, | 9 years |
| Quiescent stage ... ... | 127 | 23·8 ,, | 9·7 ,, |
| Palmar lesions ... ... | 5 | 25 ,, | 14 ,, |
| " Studded lesions " ... ... | 37 | 28·8 ,, | 13·5 ,, |
| Gummata tertiary state ... | 67 | 29·3 ,, | 16·3 ,, |

H. S. S.

REBUFFAT (E.). Le dermatol dans le traitement du pian. **[Dermatol in the Treatment of Yaws.]**—*Ann. Soc. Belge de Méd. Trop.* 1926. July. Vol. 6. No. 2. pp. 213–218.

This author, employing 3 cc. of a 10 per cent. oily suspension of dermatol intramuscularly twice weekly in the treatment of yaws and syphilis among natives at the hospital of Coquilhatville, while confirming the therapeutic efficacy of this remedy, points out very clearly the dangers of bismuth medication among native patients. He finds that 10 injections form the best course for treatment, but that this total is very frequently followed by stomatitis and albuminuria with cachexia and death in a certain proportion. He believes, and it is an interesting point, that the drug acts primarily on the kidney, and then only on a damaged kidney, pointing out that a third of all native patients show an albuminuria, the stomatitis being secondary to the damaged kidney and due to a fuso-spirillar infection.

H. S. S.

LEACH (Herbert). **Note on the Use of Bismuth Metal in Isotonic Glucose Solution as compared with an Aqueous Solution of Bis. et Sod. Tart. in the Treatment of Yaws.**—*S. African Med. Rec.* 1926. Oct. 9. Vol. 24. No. 19. pp. 427–428.

The advantages of using the former preparation are, according to the author, working in Northern Rhodesia, no pain and no swelling and stomatitis rare. The disadvantages were difficulty with clogged needles, increased cost in the proportion of 3d. as compared with a farthing per dose, and slower action, a point of some consideration when dealing with the impatient native. In some cases the metallic preparation was given first, and Bis. et Sod. Tart. subsequently. [It might have been to greater advantage to treat cases till clinical cure was established by the double salt, and then to give the metal, thereby establishing a depot for slow absorption.]

H. S. S.

DIXON (Patrick K.). **Some Toxic Effects of Sodium Bismuth Tartrate.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 305–306.

Of 90 intravenous injections given 38 caused no reaction, 21 slight reaction, 24 severe reaction, 7 very severe reaction. The author's conclusions are as follows: "Sodium bismuth tartrate may contain a toxic impurity. Elderly or delicate persons are more susceptible to this substance than are children and young adults. The toxic substance may be derived from the drug itself by oxidation or dissociation."

[This high proportion of toxic effects certainly calls for explanation, and in the text it is stated that a four ounce bottle was purchased locally (Katanga).]

H. S. S.

DOBELL (Clifford). **A Note on the Generic Name of the Spirochaete of Syphilis (*Treponema pallidum* Schaudinn, 1905).**—*Parasitology.* 1926. Dec. Vol. 18. No. 4. pp. 368–369. [9 refs.]

In Special Report No. 19 of the Medical Research Council Dobell produced the evidence then available to show that the "correct" generic name for the causal organism of syphilis was *Spironema* Vuillemin, 1905. Dr. C. W. STILES of Washington has, however, now pointed out " that the generic name spironema had already been introduced into botanical nomenclature—for flowering plants—on at least three occasions prior to 1905." At the author's request Dr. STILES supplied exact references, and these Dobell has now been able to verify. " The correct generic designation of the organism in question is *Treponema* Schaudinn, 1905," therefore taking priority over *Microspironema* Stiles and Pfender, 1905.

H. S. S.

SOEPRAPTO. Prophylaxis der Dementia Paralytica. [**Prophylaxis of General Paralysis.**]—*Geneesk. Tijdschr. v. Nederl. Indië.* 1926. Vol. 66. No. 4. pp. 561–563.

The author briefly quotes four cases of general paralysis in natives, without giving argument for his diagnosis. Two cases were in Javanese women, who had been living in concubinage with Europeans; the other two concerned a Chinese merchant and a Javanese ex-soldier. In all these cases the patients had been in the habit of drinking alcohol, though nothing is said about the quantity taken. Soeprapto ventures to consider the neurotoxic influence of alcohol as one of the predisposing factors for general paralysis in syphilitics, together with other noxious influences of civilization and modern life. His recommendation " to sail around the cliffs of civilisation " constitutes a very vague guidance in the combating of this disease.

W. J. Bais.

MARGERIDON (Paul). La lutte antisyphilitique en Afrique équatoriale. [**The Antisyphilitic Campaign in Central Africa.**]—*Presse Méd.* 1926. Nov. 20. Vol. 34. No. 93. p. 1467.

The author during a journey from Cairo to the Cape remarked the " enormous frequence of syphilis " among the native populations of the Sudan, Uganda, Tanganyika Territory, Belgian Congo and Rhodesia. He refers to the skin and bone lesions as commonly seen in natives and lays stress on the fact, of course well known, that syphilis of the nervous system among natives is rare. He also believes that the hereditary disease takes a first place as a cause of syphilitic manifestations among natives and as a cause of abortion and infant mortality. With some of these opinions, he states, local medical men do not agree, and in this leading article no mention is made of the conditions under which his observations were made. It therefore rather remains as a general statement of opinion. In seeking for some explanation of the absence of nervous system syphilis he suggests, as others have done before him with really no reason, that malaria may be the determining factor.

H. S. S.

CÉARD (L.). Action locale du stovarsol dans un cas de syphilome phagédénique de la lèvre inférieure. [**Local Action of Stovarsol in a Case of Phagedaenic Syphiloma.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. June. Vol. 4. No. 2. pp. 340–342. With 1 plate.

The author describes the case of a native girl aged sixteen seen at Colomb-Bechar with a phagedenic ulcer of the lower lip which healed under 14 daily local applications of a solution of stovarsol (1 gm. in 20 cc. distilled water), no other treatment being given. The lesion commenced 6 weeks before as the result of a scratch. In the absence of any history or sign of syphilis in the girl herself before the injury or in her family, a diagnosis of a primary chancre was made when the W.R. was found to be positive, though it is noted that two examinations failed to show treponemata in the lesion. The patient was delivered of a child a few weeks later having all the classical signs of hereditary syphilis. The author concludes by remarking on " this extremely easy and efficacious treatment." [One would like to know more of the after-history of this girl before joining in this eulogism.]

H. S. S.

SHAW (Violet A.). **Case of Gangosa.**—*China Med. Jl.* 1926. Dec. Vol. 40. No. 12. pp. 1236–1237.

Miss Shaw reports the case of a boy aged 15 showing a lesion of the left nostril which was diagnosed as gangosa by Dr. CHANG. The case is noticed as the first seen in Honan during 8 years' work. The history given shows that after a blow on the right side of the head there was bleeding from the left nostril and irritation which caused the boy to scratch the septum. Four months later the left nostril and septum were gone. Large glands were found at the angles of the jaws and in the axillae. " A direct smear showed numerous *Treponema pertenue.*" Temperature 100 to 102° F. [No W.R. reported. There would appear to be some doubt whether this was a case of gangosa or whether actually *Treponema pallidum* was found.]

H. S. S.

HEIMBURGER (L. F.). **Severe Bismuth Poisoning. A Case successfully treated with Sodium Thio-Sulphate.**—*China Med. Jl.* 1926. Sept. Vol. 40. No. 9. pp. 842–845.

A day after the last of four intramuscular injections each of 2 cc. of a 10 per cent. emulsion of bismuth salicylate in olive oil at 3-day intervals, the patient, a woman aged 26 infected from her husband, was admitted to hospital with marked bleeding from the mouth. Examination revealed the usual signs of severe bismuth stomatitis with petechiae scattered over thorax, abdomen and limbs. The urine contained albumin, epithelial and red blood cells in abundance: the blood, nearly 4 million red cells with megalocytes and microcytes present: sputum bloody: W.R. ++++. Thiosulphate 1·2 gm. thrice daily by mouth for 3 days and 0·5, 0·75, 0·9, 1·0 gm. intravenously on successive days relieved the condition most successfully, although the anaemia became more marked at first. At discharge on the 18th day the urine was negative.

H. S. S.

HERMANS (E. H.). Het verloop van de syphilis bij den Inlander. [**The Course of Syphilis in the Native.**]—*Geneesk. Tijdschr. v. Nederl. Indië.* 1926. Vol. 66. No. 4. pp. 531–545. [20 refs.]

**Tertiary yaws, which has been better recognized of late, has previously often been taken for tertiary syphilis, which error resulted in an apparent discordancy between the prevalence in the natives of tropical countries of primary and secondary syphilis on the one side and the tertiary stages**

of this disease on the other. Syphilis in the native which happens to come under medical observation from the beginning, does not show much difference from that of the European, but for a greater inclination to localize in the skin. On the other hand, neuro-syphilis and parasyphilitic affections are comparatively rare in the native. The latter have even long been considered not to occur at all in tropical races, but apparently lately they are becoming more prevalent. Hereditary syphilis is also rare.

These differences are not to be ascribed to racial peculiarities, but to the fact that syphilis in the native so far has not been much interfered with by treatment, especially by the modern treatment with arsenical compounds. Such treatment drives the spirochaetae from the skin and mucous membranes, and causes them to seek a hiding place in the nervous system, which is less accessible for the chemicals. The increase of parasyphilis is considered by Hermans to be a sequel of modern treatment and an incitation to criticism of a too energetic treatment of the early symptoms of syphilis.

W. J. Bais.

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JEANSELME (E.) & ELIASCHEFF (O.). Examen histologique de deux nodosités juxta-articulaires. [**Histological Examination of Two Juxta-Articular Nodules.**] — *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. Aug. 5. Year 42. 3rd Ser. Vol. 50. No. 28. pp. 1404–1406. [3 refs.]

In this article is described the histopathological picture found in sections of two nodules removed from two old persons living in France and suffering from chronic rheumatism, one of whom was apparently syphilitic. Information on the clinical side is wanting, though the lesions are apparently accepted definitely as cases of J.A.N. by Jeanselme. In the one case the node was composed of irregularly disposed bundles of fibrous tissue poorly vascularized and without any elastic fibres, enclosing a central area of necrosed amorphous tissue. A few polynuclear cells were noted and at the periphery of the amorphous zone large polygonal endothelial-like cells which were in reality swollen connective tissue cells enclosing numerous nuclei, but there was no lymphoid infiltration, no endarteritis and no thrombo-phlebitis. In the second case three zones were distinguished: an outer zone of young, in places richly vascularized, connective tissue, the medium sized vessels showing endothelial proliferation and thickened walls with some perivascular leucocytic infiltration, but no plasmocytes. In the middle zone was found rather denser connective tissue, fewer cellular collections, but the characteristic large swollen endothelioid cells were again seen. The innermost zone consisted of a homogeneous necrotic tissue showing vessels completely obliterated by endarterial proliferation.

No spirochaetes or other organisms were demonstrated.

H. S. S.

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JEANSELME (E.) & ELIASCHEFF (O.). Contribution à l'étude de la structure des nodosités juxta-articulaires. [**The Structure of J.A.N.**]—*Schweiz. Med. Woch.* 1927. Jan. 8. Vol. 57. No. 2. pp. 25–27. With 2 text figs.

After making some reference to cases of this condition occurring in persons in whom a history of yaws could be excluded and to the histological examination of a node by the authors removed from a case in Madagascar in which the changes were so far advanced as to preclude any idea being formulated as to the origin of the nodule, they describe the pathological picture obtained in sections of a nodule removed from a woman of 80. The patient suffered from chronic rheumatism with marked deformity of the hands and subluxation of all the metacarpo-phalangeal joints. Nodules occurred about the elbow and knee having the characteristics of J.A.N. Yaws was excluded ; syphilis might be suspected owing to an aortic murmur and a history of three abortions and death of one of six children at tender age [questionable evidence of syphilis]. Microscopically the node was found to consist of fibrous tissue undergoing, as the inner zones were reached, necrotic change. About the borders of the necrotic zones pseudo-giant cells were noted, but no lymphoid cells were present. Nor was there any evidence that the process had origin about the blood vessels. There was no endarteritis nor thrombo-phlebitis, such as is seen in syphilitic lesions.

H. S. S.

JESSNER (Max). Ueber syphilitische juxtaartikuläre Knotenbildungen. [**Syphilitic Juxta-Articular Nodules.**]—*Arch. f. Dermat. u. Syph.* 1926. Nov. 13. Vol. 152. No. 1. pp. 132–157. With 8 text figs. [Numerous refs.]

The author describes three cases of J.A.N. with syphilis, he believes, as the etiological factor and deals fully with the histological findings. He then refers to all the other published cases in which yaws can be excluded as a cause. He accepts 62 such cases ; 20 from Europe and North America and 42 from North Africa. These cases are then analysed and very fully discussed.

In a number of cases other manifestations of syphilis have been found, including a tertiary syphilide, a marked secondary eruption, a tubero-serpiginous syphilide, a mixed secondary and tertiary lesion, papular exanthem, choroidoretinitis, gummatous ulcer of leg, leukoplakia of tongue, cardiac disease with cirrhosis of the liver, apoplexy. In others an associated arthritis has been considered to be syphilitic in origin. Among the author's own cases one had an ulcer on the thigh which cleared up under salvarsan, the second a dilatation of the aorta and the third an ulcer of the foot with gangrene which may have been caused by arterio-sclerosis or have been the result of an obliterating arteritis due to tobacco. The W.R. is positive in nearly all cases. Jessner in opposition to SPARACIOS believes that, judging by reports, treatment with antisyphilitic remedies is followed by diminution in size and disappearance of the nodules in the majority of cases, even in old cases, and quotes a third case in which the nodules had been present for 32 years.

The pathological changes described by many observers for their cases and those described by the author are very varied, there being no uniformity in the histological picture. Whether there is a definite sequence in changes according to the age of the lesion has not been determined. Further, there appear to be no definite differences in lesions due to syphilis and those due to yaws except possibly that degenerative changes are commoner in the former. Jessner states that both clinically and histologically the lesions in the syphilitic cases show considerable deviations from other specific lesions and believes that this accounts for their recognition being so long delayed. In his case a xanthomatous degeneration was noted. This appears to be the first time cholesterin has been found in a syphilitic case, though well-known in cases of tropical J.A.N. The fact is recalled that MENDELSON in Siam has described chalky amyloid, and fatty degeneration in his cases, and denies a spirochaetal etiology, and that TAKASAKI under the name Xanthoma tropicum regards J.A.N. as inflamed fibromata. While believing definitely that J.A.N. are manifestations associated with yaws or syphilis, Jessner finds that there is no way of distinguishing the two conditions. He thinks that the lower extremity is more commonly affected in yaws cases, the the upper in syphilitic cases. He also makes the interesting observation that though the lesions occur in syphilitics they may not be syphilitic in nature.

This is borne out to some extent by the unusual histological picture referred to above and by the infrequence of finding spirochaetes ; on the other hand, this difficulty is met with also in many tertiary lesions of yaws and syphilis.

The author found no spirochaetes in his cases and rabbit inoculation proved negative. Regarding the differential diagnosis, mention must be made of the fibro-cartilaginous nodes, sometimes ossified, sometimes calcified, described by DEJERINE and CEILLIER as occurring in paralysed limbs. These non-tropical cases of J.A.N., if they be syphilitic in origin might well be designated fibroid gummata or syphilitic fibroma, terms already used by some authors They would be considered rare manifestations of syphilis and DE QUERVAIN has postulated the possibility of a " fibrotropic " strain of spirochaete. It seems more likely, however, that the tendency to produce fibrous tissue is a reaction of the part of the body characteristic of certain persons or races, a kind of diathesis, and it seems certain that trauma plays no uncertain part in production and localization of the lesions.

[There is nothing essentially very new in this paper (all the cases mentioned have already been referred to in the *Bulletin*), but it is a valuable summary and discussion and is followed by an exhaustive bibliography.]

H. S. S.

WORSTER-DROUGHT (C.). **Subcutaneous Fibroid Syphilomata. A Rare Manifestation of Late Syphilis.**—*Lancet.* 1926. Sept. 25. pp. 637–639. With 2 text figs. [19 refs.]

The author places on record a case of that rare but interesting condition to which PARKES WEBER called attention in 1920 under the name given above. The present case forms the sixth of the series to be reported, and of these previous cases Worster-Drought gives short summaries.

In the present case, a married woman aged 27, with a history suggesting inherited syphilis, but none to suggest the acquired disease, a series of hard subcutaneous nodules which appeared three months before, extend from just below the olecranon to a point three inches above the styloid process of the ulna. The nodules are bilaterally symmetrical and diminish progressively in size from above downwards varying from 2 cm. to a few millimetres in diameter ; they are hard, adherent to the deeper tissues, but the skin is freely movable over them. They lie along the course of the ulna nerve and pressure upon them produces pain in the distribution of the nerve though the nodules themselves are insensible. Over the ulna area of each hand there is some hyperalgesia to pinprick, but no other signs of nervous involvement.

X-ray examination revealed some periosteal nodes on each ulna, but not corresponding to the subcutaneous nodules. Wassermann reaction positive. Sections of an excised nodule proved it to be of the nature of a gumma—" masses of fibrous tissue separated by a looser tissue which is highly vascular. The vessels in this latter are surrounded by aggregations of inflammatory cells, chiefly small round cells. Some of the vessels show thickening of the intima with very little infiltration of the vessel wall ; other vessels show thickening of the adventitial coat with marked infiltration by small round cells." [No examination for spirochaetes is mentioned.] Treatment by means of N.A.B., mercury and potassium iodide caused the entire disappearance of the lesions.

[This case is given in some detail as it would appear to be a most typical example of the condition which forms the heading of the paper, and which clinically may, I think, be distinguished from juxta-articular nodules as known to tropical practitioners. There are, however, many cases presenting features intermediate between these two well-marked groups which are very puzzling, but whose pathogeny will doubtless be settled as more and more of them are recorded with clinical and pathological findings.]

H. S. S.

MARGERIDON (Paul). Des nodosités juxta-articulaires ; leur répartition en Afrique équatoriale. [**Juxta-Articular Nodules; their Distribution in Equatorial Africa.**]—*Presse Méd.* 1926. Dec. 15. Vol. 34. No. 100. pp. 1579–1580. With 3 text figs. [2 refs.]

During a journey by motor car from Cairo to the Cape the author kept a look out for cases of this affection, and noted cases at Melut and Adok in the Sudan, at Lira in Uganda, at Tinde in Tanganyika Territory, at Kabalo in the Belgian Congo and at Bukama in the Katanga province. He quotes MARSAULT and DUPUIS as stating that the condition is common in the Congo. The cases reported were typical, but no history is given for any of them.

H. S. S.

MENDOZA (D.). El Bismuto en el tratamiento de la Buba —*Rev. Med. y Cirug.* Caracas. 1926. May. Vol. 9. No. 98. pp. 92–96.

WINCKEL (Ch.). Progress achieved in combating the Framboesia Tropica.—*Indian Med. Rec.* 1926. Apr. Vol. 46. No. 4. p. 97.

## GRANULOMA VENEREUM.

FOX (Howard). **Granuloma Inguinale : its Occurrence in the United States. A Report of Fifteen Cases observed in New York.**—*Jl. Amer. Med. Assoc.* 1926. Nov. 27. Vol. 87. No. 22. pp. 1785–1789. [27 refs.]

A very interesting paper, dealing more particularly with 15 cases observed by the author, together with an analysis of 150 cases observed in U.S.A. collected from the literature (complete bibliography given). The numbers and relative distribution are probably no criterion of the actual facts, as only reported cases are dealt with. The disease is widespread throughout the States and probably more common in the south than in the north and west. The average age (131 cases) was 30 years with limits at 15 and 60. The ratio of negro to white was 9 : 1. Duration (127 cases), 10 days to 26 years; average, 3¼ years. Site was in every case in the neighbourhood of the genitalia, groin, 70; penis, 53; vulva, 44; perineum, 28; pubes, 22; scrotum, 21; anal region, 13; buttocks, 12; thighs, 10; scrotal thigh fold, 5; sacrum, 3. In 9, other areas were affected as well—cheek, neck, nose, throat, mouth, lip, pharynx and larynx, back of hand, thigh; with microscopical examination and confirmation in 2 only. In 102 cases the W.R. was performed, 35 giving positive result and 67 negative. Donovan bodies were found in 11 of the 15 cases. The histopathological changes were studied by Alexander FRASER in 7 of the author's cases, and his description is as follows:—

"The histologic features of the lesions in all these cases are essentially the same, and one description can be made to apply to all.

"The general outstanding feature of the lesion is its markedly destructive character, the normal architecture of the skin and subcutis being extensively destroyed and replaced by new elements. In places the epiderm is absent and replaced by serum, fibrin and polymorphonuclear leukocytes with a variable number of lymphocytes, plasma cells and large mononuclears. This exudate extends for variable depths, sometimes for the whole depth, of the corium. In these ulcerative areas the tissue is edematous, the thin walled blood and lymph vessels are distended, and frequently ruptured, thus giving rise to irregularly shaped pools of blood and lymph. The preserved epiderm adjoining the ulcerated areas shows very marked regenerative hyperplasia, expressing itself in long downgrowths of the epithelial pegs. The immediately adjoining corium or subcutis shows a rather characteristic dense plasma cell infiltration, running through which can be seen a network of capillaries with very marked hyperplasia of the endothelium presenting the appearance of solid cords of large pale staining "epithelioid" cells. Extending from this zone, the proliferation of fibroblasts and the production of collagen dominate the picture, the collagen appearing frequently in large patches or strands, and extensively hyalinized. In the peripheral zone, too, the arteries and arterioles show marked thickening and rather peculiar changes. Many of them show moderate lymphocytic infiltration of the whole wall together with proliferation and adhesion of the endothelial cells frequently to the extent of obliteration. The musculature in many cases is replaced by dense hyalinized fibrous tissue.

"These changes vary in position and extent in different sections and in different cases but are present in essentially the same manner in all. The picture corresponds to that seen in granuloma inguinale, though it is not specific."

Treatment with tartar emetic was used, but reference is made to the use of antimony sodium thioglycollate and antimony thioglycollamide and Roentgen rays.

H. S. Stannus.

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MCINTOSH (J. A.). **The Etiology of Granuloma Inguinale.**—*Jl. Amer. Med. Assoc.* 1926. Sept. 25. Vol. 87. No. 13. pp. 996–1001. With 8 text figs. [13 refs.]

To quote part of the author's own summary:—

"The study reported in this paper tends to prove that the Donovan body is the cause of granuloma inguinale by fulfilling the generally accepted criteria of specificity first stated by Koch. First, the organism was demonstrated in the lesion in fourteen out of fifteen spontaneous cases. Second, it was obtained in pure culture in eight of these fifteen cases. Third, a tissue graft from a spontaneous case in which Donovan bodies were demonstrated and from which they were isolated in pure culture reproduced the disease in an individual not previously exposed in any way to the possibility of spontaneously contracting this disease. Fourth, pure culture of the Donovan body was again obtained from this experimental lesion. And, further, antibody production against the cultivated Donovan body was demonstrated by the presence of agglutinins, precipitins, globulin changes and skin sensitiveness in the spontaneous and experimental cases."

Further, it is noted that all the patients were negroes, 10 males, 5 females ; the duration of the lesion ranged from 3 weeks to 13 years. The formol-gel test was positive in 14 of the 15 cases. For diagnostic purposes the swollen hyperplastic endothelium of the capillaries in zones in which there are numerous large swollen mononuclear cells filled with Donovan bodies forms a characteristic picture. Those interested in this subject should consult the original paper in which will be found full bacteriological and inoculation results.

H. S. S.

JOHNSTON (Langloh P.). **Granuloma Tropicum.**—*Med. Jl. Australia.* 1926. July 24. 13th Year. Vol. 2. No. 4. p. 112. With 2 text figs.

The report of a man aged 21 years from Noumea with an 11 years' history of ulceration between the buttocks which, in spite of a triple positive Wassermann reaction, did not respond to anti-syphilitic treatment. 0·03 gm. of sod. ant. tartrate given intravenously, however, caused healing in a week. Four other injections completed the course, and the patient now suffers from anal stenosis. " Leishman-Donovan bodies" were not found, but no other pathological findings are mentioned.

H. S. S.

SHATTUCK (George C.), LITTLE (Harold G.) & COUGHLIN (William F.). **Treatment of Inguinal Granuloma with Thioglycollates of Antimony.** —*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 307–317. With 3 text figs. [3 refs.]

Following along the lines advocated by RANDALL [this *Bulletin*, Vol. 22., p. 239], who used these preparations intravenously, the authors treated three cases of granuloma inguinale—the white wife of a negro and two negroes, the first with sodium antimony thioglycollate (" S.A.T.") intravenously followed by intravenous and intramuscular injections of the triamide of antimony thioglycollic acid (" T.A.T.") ; the second with intravenous T.A.T. and the third with intramuscular T.A.T. In the first 3–20 cc. of a ·4 per cent. solution was used with a total of 1·457 gm. T.A.T. and 22·4 gm. S.A.T. spread over 127 days. In the second a total of 0·976 gm. T.A.T. was given at 2 day intervals in doses of 8–30 cc. of 0·4 per cent. solution in 36 days. In the third case 2–10 cc. were injected with a total of 0·476 gm. in 40 days when the lesions were healed. The authors speak highly of the results obtained.

H. S. S.

KINGSBURY (Jerome) & PECK (Samuel M.). **Treatment of Phagedenic Ulcerations of the Genitals with Intravenous Administration of Antimony and Potassium Tartrate.**—*Jl. Amer. Med. Assoc.* 1926. Dec. 4. Vol. 87. No. 23. pp. 1900–1902. [7 refs.]

The authors while trying this drug in the treatment of granuloma inguinale extended their observations to cases of phagedenic ulceration of the genitals and give details of three such cases. They used a 1 per cent. solution commencing with a 3 cc. dose increased by 1 cc. at each injection up to 10 cc.; 3–4 injections weekly being given. As in granuloma inguinale treatment must be prolonged over the time of complete healing. The results thus obtained by intravenous injection were very good, while in their hands local applications of the drug met with poor success.

H. S. S.

## CLIMATIC BUBO.

TODD (A. T.). **Poradenitis, or Subacute Lympho-granulomatosis.**—*Lancet.* 1926. Oct. 2. pp. 700–702. With 1 text fig. [6 refs.]

After some general remarks on the condition better known to tropical practitioners as climatic bubo, the pathological features are mentioned at some length, including the finding of the cell-inclusions described by other writers, and then the clinical notes of two cases which came under Dr. Todd's notice are given. The author accepts the cell-inclusions as parasites and believes that the diagnosis of the condition is easy by means of gland puncture and examination of smears made from the gland pulp, so removed, for these bodies, which he believes are found easily in all cases. He mentions treatment by emetine with or without iodine as specific, but appears to be unaware of the brilliant results obtained by protein shock therapy.

H. S. Stannus.

VERDELET & AUCHÉ (J.). Notes sur deux cas de lymphogranulomatose de l'aine. [**Two Cases of Lymphogranuloma of the Groin.**]—*Jl. Méd. de Bordeaux.* 1926. Oct. 10. Vol. 103. No. 17. pp. 739–740.

The cases of two young men who had never been abroad, who each presented enlargement of inguinal lymph nodes preceded by a small penile lesion are here recorded. The lesion in the one case was a small ulcer at the frenum, in the second in the balano-preputial sulcus, neither having the character of a hard or soft chancre. In each case the homolateral iliac glands could be made out to be enlarged. The W.R. in each case was negative and blood examination showed a mild polynuclear leucocytosis. The affected glands were small in each case, but showed signs of softening. They were extirpated and the diagnosis rests upon the histological examination in each case [without any description being given]. Bacteriological examination [method employed not mentioned] was negative in one case, in the other staphylococci were found.

H. S. S.

**Clément** (Robert). L'étiologie du granulome vénérien; adénopathie inguinale subaiguë simple à suppuration intraganglionnaire. [**Climatic Bubo.**]—*Presse Méd.* 1926. Nov. 13. Vol. 34. No. 91. pp. 1429–1431. [28 refs.]

After pointing out the differences of opinion held by various writers, due largely he believes to their ignoring one another's work, the author discusses the confused nomenclature in use and then passes on to a history of the diverse bacteriological findings by numerous observers, and a lengthy consideration of the etiological relation of Donovan bodies and the condition under review, which should be consulted by all interested in the subject.

[It only remains for the reviewer to point out how confusion is like to be worse confounded by the author's using the term " granulome vénérien " for the condition we know as climatic bubo in contradistinction to granuloma venereum.]

H. S. S.

## TROPICAL MYCOLOGY.

MATTLET (G.). Mycoses dans l'Urundi. [**Mycoses in the Urundi District.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Apr. Vol. 6. No. 1. pp. 1–41. With 19 text figs. [9 refs.]

From the sputum of patients suffering from bronchial affections, fungi of the genera *Torula, Cryptococcus, Blastodendrion, Mycoderma,* and *Sterigmatocystis* were isolated. Treatment with potassium iodide and cacodylate of soda or novarsenobenzol resulted in notable improvement, but in some cases the fungus (Blastodendrion) persisted in the sputum after the condition had improved.

Species of Monilia and Blastodendrion were found to be present in association with various bacteria in an affection of the throat called by the natives " Kafindofindo ". This involves the base of the tongue and in benign cases occasions pain on deglutition, but in severe cases there are in addition violent pains in the neck and intense fever. It attacks both sexes and all ages, and severe cases are frequently fatal. Treatment consists in scraping the tongue and the application of glycerine and iodine or tincture of iodine.

Species of Willia, Monilia, Mycoderma, Blastodendrion and Cryptococcus were found in the faeces of patients with symptoms of true dysentery ; careful examination failed to reveal cysts of amoebae in the faeces. Treatment with potassium iodide with purgatives, intestinal disinfectants with laxatives, or intramuscular injections of emetine with small doses of alkaline purgatives, resulted in the progressive disappearance of the symptoms accompanied by a diminution in the number of parasites. *Willia bispora* was isolated from a tumour on the descending colon of a female who died after exhibiting dysenteric symptoms. Symptoms of enteritis were shown by patients from whose faeces species of Blastodendrion, Mycoderma, Willia and Monilia were obtained. Generally ten intramuscular injections of emetine, each of 5 centigrammes, accompanied by gentle laxatives cured the condition and caused the disappearance of the fungus. A Cryptococcus was found associated with bacteria in a vast ulceration of the jaw.

The morphological, cultural and biochemical characters of the various organisms are described. Owing to lack of animal material, inoculation experiments were not made.

P Tate.

NICAUD (P.). Les mycoses pulmonaires. [**Pulmonary Mycoses.**]—*Presse Méd.* 1926. Dec. 4. Vol. 34. No. 97. pp. 1521–1524. With 7 text figs. [14 refs.]

Pneumomycoses, though common, are frequently thought to be secondary infections, but MACAIGNE and Nicaud have observed a case of primary infection due to an Aspergillus. Clinically, pneumomycoses do not exhibit any distinctive symptoms, but may simulate chronic bronchitis, pulmonary tuberculosis, or broncho-pneumonial sclerosis. Sometimes they may be suspected through such features as long conservation of the general health, or frequent haemoptysis. The lesions themselves are variable, and there may be nodular lesions difficult to distinguish from those of syphilitic or tuberculous origin.

The principal pneumomycoses are :—*Mucormycoses*, rare and generally secondary infections. *Aspergilloses*, the chief species being *A. fumigatus*, a common saprophyte which is pathogenic for the pigeon, rabbit and guineapig. Very frequently aspergillosis is a secondary infection, most commonly associated with tuberculosis, but it may be a primary and fatal infection. *Oosporoses*, the commonest type being actinomycosis, may be primary with fatal termination, or may be secondary infections of tuberculous or other lesions. *Sporotrichosis* of the lung is rare and is caused only by the species *S. beurmanni*. Serodiagnosis and fixation of the complement are possible, but are not specific, as the reactions are also given in cases of actinomycosis and " thrush." Generally, pulmonary sporotrichosis is secondary to a cutaneous infection.

P. T.

CHYURLIA (N). **Notes on a Case of Bronchomycosis.**—*Jl. Trop. Med. & Hyg.* 1926. May 15. Vol. 29. No. 10. pp. 145–146.

The patient, a woman aged 42 years, had suffered almost continuously since childhood from bronchial catarrh. The condition increased in severity and was diagnosed as chronic bronchitis. The Koch bacillus was not present, but yeast-cells were constantly found in the sputum and, later, fine hyphae. Cultures of the organism were obtained on Sabouraud's agar and it was identified as *Monilia krusei* (Cast. 1909). Injections of iodides, inhalations of balsamics, alkalines by mouth, application of ultra-violet rays, and the use of special autovaccine according to STEINFELD, have considerably improved the condition.

P. T.

KOTKIS (A. J.), WACHOWIAK (M.) & FLEISHER (Moyer S.). **The Relation of Monilia to Infections of the Upper Air Passages.**—*Arch. Intern. Med.* 1926. Aug. 15. Vol. 38. No. 2. pp. 217–221. [8 refs.]

Fungi were isolated from three cases of thrush (2 of babies and 1 of an adult) and from five cases of patients suffering from bronchitis associated with asthma of rather long duration. The organisms, which are provisionally classed as Monilia, appear to be similar from all cases, although they vary slightly in the reactions on carbohydrate media. Two of the bronchial cases were treated with vaccines prepared from the organism isolated and showed some improvement.

The pathogenicity to rabbits varies with different strains of Monilia, and generally large doses are necessary to kill the animal; but when injected intratracheally death practically always ensues.

The authors incline to the opinion that the Monilias in such cases as these are secondary infections, although they may be responsible for maintaining the chronic symptoms.

P. T.

CASTELLANI (Aldo). **Tonsillomycoses.**—*New Orleans Med. & Surg. Jl.* 1926. Apr. Vol. 78. No. 10. pp. 651–661. With 5 text figs. [2 refs.]

Chronic tonsillomycosis is generally due to Microsiphonales. Cases due to the genera *Nocardia* and *Cohnistreptothrix* are rare, and usually only one tonsil is affected. The affected tonsil is much enlarged and contains one or several small abscesses, the pus of which contains yellow or white granules due to the fungus. Leptothrix and Vibriothrix-like organisms occur in masses in the granules, which appear as whitish spots on the tonsils in cases of the little known condition of granular mycoses of the crypts. The affection is chronic, is not painful, and is generally accompanied by an offensive odour from the breath.

Acute and subacute tonsillomycoses are comparatively common, and are associated with fungi of the genera *Monilia, Saccharomyces, Cryptococcus, Oidium, Willia* and *Hemispora.* Clinically the conditions are similar whichever organism is concerned, except in the case of Hemispora, where the symptoms do not disappear so rapidly and the patches are greyish and not creamy. The prognosis is usually favourable but, clinically, acute tonsillomycoses may simulate diphtheria, Plaut-Vincent's angina and follicular tonsillitis. Illustrative cases are described.

P. T.

MONTPELLIER (J.) & CATANEI (A.). Présence du même *Monilia* chez deux malades porteurs de lésions differentes de la cavité buccale. [**The Same Monilia present in Different Mouth Lesions.**]—*C. R. Soc. Biol.* 1926. July 23. Vol. 95. No. 26. pp. 568–569.

A Monilia, differing in its morphology and biochemical reactions from *M. albicans,* was isolated in Algeria from a typical case of "thrush," and also from a case of a form of superficial glossitis common in Algeria in patients suffering from superficial suppurations of the head. In the latter case it was associated with streptococci.

P. T.

FILHO (Pereira). **Macroglossia Mycotica.**—*Jl. Trop. Med. & Hyg.* 1927. Jan. 1. Vol. 30. No. 1. pp. 8–10. With 2 text figs.

This case of Macroglossia mycotica was observed at Porto Alegre, Brazil, the patient being an Italian aged 53. It began as a slight hypertrophy of the tongue about 12 years ago, and soon a thick white coating covered the whole tongue. The general health was good. Microscopical examination of scrapings showed long, septate hyphae and gram positive bacilli and cocci, but no yeast cells. On Sabouraud's glucose agar bright white colonies appeared in 48 hours at 37°. These were composed of round or oval cells arranged in pairs, or rarely isolated or in chains. In the water of condensation some mycelium was formed. Asci were not produced. The organism is regarded as a Monilia. The biochemical reactions place it in the Pinoy group of CASTELLANI, but it differs from *Monilia pinoyi* and *M. nabarroi* in producing acidity but not gas in saccharose and galactose, and is therefore considered to be a new species and called *M. aldoi.*

Intraperitoneal inoculation of a rabbit with an emulsion of a pure culture on Sabouraud's medium causes death in 3 days; and intravenous inoculation of a guineapig with similar material caused death in 2 days.

P. T.

STUTZER (M. I.) & ABRAMOWITSCH (F. E.). Zur Frage ueber die Biologie der Aktinomyzeten. **[On the Biology of Actinomyces.]** —*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. German summary pp. 237–238. [In Russian pp. 175–189. 13 refs.]

The cultures, of which 64 were studied, were isolated from the air, soil, straw, excrement, intestinal contents, and from actinomycotic lesions of man and animals.

Morphologically they fall into 3 groups typified by *Actinomyces* [*bovis*] Harz 1877, *Brevistreptothrix* [*Actinomyces*] *Israeli* [Kruse 1896] and *Actinobacillus lignieresi* [representing respectively the sub-sections Majores and Breviores of CHALMERS and CHRISTOPHERSON 1916, and *Actinobacillus* Brumpt 1910].

Very good growth was obtained on a medium composed of bran 25 gm., straw 25 gm., peptone 10 gm., glycerine 20 gm., potassium phosphate 1.5 gm., sodium chloride 5 gm., water 1,000 cc., agar 2 per cent.

The results show that the depth of pigmentation may vary greatly in different colonies of the same culture. Actinomyces are comparatively inactive towards carbohydrates, but glucose, arabinose and dextrose are the most readily attacked and, in fluid media, dextrin and lactose greatly increase growth. A few days' growth may change the reaction of the medium to the alkaline side. They also grow on cellulose. Milk is coagulated by 87 per cent. of the cultures; but lipase is not present. *Actinomyces* Harz and *Brevistreptothrix Israeli* peptonize egg-albumen, but Actinobacillus does not. The two latter genera do not cause haemolysis. Catalase is present as an endoenzyme.

Investigation of the growth of mixed cultures of Actinomyces and various bacteria indicates that the poor growth of Actinomyces in the gut of man and animals is due to the inhibiting effect of the intestinal bacteria.

*Actinobacillus lignieresi* does not occur naturally as a saprophyte, Brevistreptothrix occurs seldom, and *Actinomyces* Harz commonly.

P. T.

WOO (K. M.) & YOUNG (M. P.). **Two Cases of Actinomycosis of Lung.** —*China Med. Jl.* 1926. May. Vol. 40. No. 5. pp. 461–3.

The first case was that of a male aged 50, who had slept in straw some months previously. Symptoms :—cough; pain in chest; weakness; anaemia; temperature 99–103°; sputum foetid and tinged with blood; left base flat. Microscopical examination of sputum showed numerous filaments of actinomyces. Cultures were not made. 600 cc. of pus were removed by thoracotomy and tubes were inserted and normal saline irrigations given 3 times daily for 10 days, when a bronchial fistula developed. Two drachms of potassium iodide were given daily. After 6 weeks, the lesion had healed and the patient has remained well for 4 years.

The second case was a female aged 50, who had worked in rice straw some months before. Symptoms :—pain in left chest; temperature 99–101°; W.B.C. 17000; cough; sputum rusty coloured; dullness over left base. Actinomyces was present in the sputum, and the club-shaped form was grown in anaerobic blood-agar cultures; but only the filamentous form developed in bouillon. 900 cc. of fluid were aspirated from the chest, and 3 drachms of potassium iodide were given daily for 2 weeks, after which half the amount was given daily for 6 weeks. The lung is now clear and the patient has had no trouble since.

P. T.

PROESCHER (F.), RYAN (F.) & KRUEGER (A. P.). **Report of a Case of Coccidioidal Granuloma with Autopsy Findings.**—*Jl. Lab. & Clin. Med.* 1926. Oct. Vol. 12. No. 1. pp. 57–70. With 8 text figs. [8 refs.]

This case of Coccidioidal granuloma was observed in San José, California. The patient was a male aged 61, and the termination was fatal after a duration of about 6 months. Early symptoms were slight fever, general malaise and debility, followed by pain in the left hip, right ankle and thumb. A subperiosteal abscess developed in the right side of the nose, and was followed by multiple abscesses of a similar nature, of the head, thumb and right malleolus. These abscesses did not respond to surgical or other treatment. At autopsy (a detailed description of which is given) lesions containing cysts were found in the lungs, spleen, liver, skull cap, metatarsal bones of the right foot, psoas muscle, and left clavicle.

From the pus of all the lesion, pure cultures of a fungus *Coccidioides imitis* [*Mycoderma imite*] could be obtained. Cultures of the same fungus were obtained from blood taken 4 days before death. It grows best on sucrose agar at 37° C. Acidity, but no gas, is produced in lactose, maltose, sucrose, arabinose, 1–xylose, d–galactose and glucose. Gelatine is slowly liquefied.

Experimental inoculation showed guineapigs to be more susceptible than white mice; and white rats to be refractory. The original pus was more virulent to guineapigs than pure cultures of the fungus, all animals inoculated with pus dying, while only 70 per cent. of those inoculated with cultures died. Successive inoculation from guineapig to guineapig increased the virulence of the fungus. Intraperitoneal inoculation of guineapigs caused death in about 4 weeks, and subcutaneous inoculation in from 2 to 3 months. Cysts were present in the lesions of various organs of inoculated animals, and from the pus of all the lesions recultivation of the fungus was possible.

P. T.

SLOT (J. A.). Bijdrage tot de kennis der Blastomycose van de inwendige organen. [**Contribution to the Knowledge of Blastomycosis of the Internal Organs.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 6. pp. 750–759. With 1 chart & 2 plates.

A young Chinese miner died from a subacute meningitis, which, apart from lucid intervals such as are often observed in tuberculous meningitis, did not present unusual features. In the cerebrospinal fluid yeast-like organisms were found. Post mortem examination showed the presence of the same organism in a lymph gland of the upper mediastinum. Four similar cases, collected from the literature, are briefly quoted. Probably the infection enters the body by the respiratory tract and spreads along the lymph ways.

W. J. Bias.

RHAMY (B. W.). **Blastomycosis of the Bladder.**—*Jl. Amer. Med. Assoc.* 1926. Aug. 7. Vol. 87. No. 6. pp. 405–406. With 3 text figs.

The patient, aged 47, suffered from frequent urination with burning and tenesmus. The urine contained one per cent. by volume of pus, but no bacteria were present. Numerous yeast cells were seen in smears, and pure cultures of a yeast were obtained. In its morphology and sugar reactions it resembled baker's yeast. Filaments were formed in bouillon cultures. Guineapig inoculation was negative. Treatment, first with iodine and salicylates internally, and later with hexylresorcinal and methenamine alternately, caused rapid improvement.

P. T.

# REVIEWS AND NOTICES.

HARVARD INSTITUTE FOR TROPICAL BIOLOGY AND MEDICINE. **Medical Report of the Hamilton Rice Seventh Expedition to the Amazon, in Conjunction with the Department of Tropical Medicine of Harvard University, 1924-1925.** [STRONG (Richard P.), SHATTUCK (George C.), BEQUAERT (Joseph C.), WHEELER (Ralph E.), Members of the Medical Expedition.]—pp.xvi+313. With 70 plates & 16 text figs. Contributions from the Harvard Inst. for Trop. Biol. & Med. No. IV. 1926. Cambridge: Harvard University Press.

The procedure we would recommend in reading this report would be, after glancing through the introduction, to take chapter I dealing with the "Amazon Forest" and then chapter XVI containing "Observations on the Branco, Uraicuera and the Parima rivers." These are full of interesting matter. As when we survey the sky we are not exactly happy unless we can name the various constellations, so here, though we have the names Branco, Urarricuera, etc., we were not quite satisfied because we could not find them on the map (Plate I) which shows little but a red line of the route followed by the expedition. When these two chapters have whetted the appetite, then the reader will perhaps more readily give himself to the miscellaneous collection of assorted fruits set before him. He may have a suspicion that some of it is "canned" and has a flavour with which he is already familiar, yet the rest is "rare and refreshing fruit" of the Amazon.

The report is concerned with the investigations along a strip of territory in the Amazon valley bounded by Manaos on the south and Caracaray on the north, and extending from Para at the mouth of the Amazon to Parahiba 64° W. longitude.

To an extremist who holds the view that intramuscular injections of quinine constitute "malpractice" a visit to the west coast of Africa and personal experience of "bilious remittent" would no doubt bring rapid conversion. To an enthusiast who holds the view that the tropics are a "health resort" a visit to the Amazon forest would soon bring disillusion. "The virgin forest of the Amazon offers little hospitality to the traveller, and it has perhaps been appropriately named by Alberto Rangel the 'Inferno verde' where one soon dies of hunger and during the dry season suffers from thirst, when almost all the streams which traverse it are reduced to some few puddles of stagnant or brackish water. No other tropical climate is more debilitating and trying than that of parts of Amazonia. Portions of Amazonia to-day constitute some of the most unhealthy and most dangerous regions to reside in from the standpoint of health which exist in the tropics."

Chapter II. "The Amazon Forest," illustrated with good photographs, describes "the vague sensation of sadness, oppression and uneasiness which affects the traveller in the silence and gloom of these vast forests where the novice, embarrassed by the lianas, wounded by the numerous spinous plants and trees, severely bitten by stinging ants and mosquitoes, may in a comparatively short time become so physically exhausted as to render his return perilous."

Climatically in the regions of the great rivers and lakes the nights are exhausting from the heat and frequently peaceful and undisturbed slumber is not possible until two or three o'clock in the morning. At Manaos the maximum humidity—81·8°—occurs at 7 a.m., while the average minimum humidity—72·7°—occurs at 4 p.m. The average temperature is 28·2° C. (82·7° F.)

Emerging then more dead than alive from the terrors of the Forest and refusing to be led aside by the seductions of chapters III to XV, we breathe again in chapter XVI on the savannas above Caracary, and catch a glimpse of the mountains on the borders of British Guiana and cheered by the sight of duck, waders and geese, we find ourselves among a people that are hospitable and friendly to travellers.

Although Boa Vista, 500 miles by river from Manaos and a town of some 1,600 inhabitants, has the next and most healthful climate of any place on the Rio Branco, yet we find among the Brazilian population of the savannas that mysterious entity *Tropical Splenomegaly* (Chapter VIII). It is the most prevalent pathological condition in the upper Amazon and Rio Branco. More than half the children in a village may show it. The various splenomegalies of which the cause is known are then discussed, e.g., those of malaria, kala azar, schistosomiasis (Egyptian splenomegaly) and rarer forms such as those due to tubercle and syphilis. The splenic anaemias, such as Banti's disease, Gaucher's disease, haemolytic jaundice are also considered, but the authors are so far unable to elucidate the cause of Brazilian splenomegaly with irregular fever. We think the coloured plate of a spleen smear from a case of splenomegaly is one of the least successful in the volume, for we can only guess what the majority of the cells represented are.

To consider now some of the remaining chapters seriatim we return to *Spirochaetal infections* (Chapter III). Syphilis is very prevalent in Manaos —population 50,000—and in the vicinity, nearly one-third of the population being affected. Yaws is much less common, but foci exist in Manaos. In Ceará, in certain hilly districts, 60 per cent. of the population suffer from the disease.

It is interesting to note the disappearance of Yellow fever in parts of Amazonia where *Stegomyia fasciata* is still found in great abundance ; these "gettings well of themselves" are only too often overlooked both in therapeutics and preventive medicine. Haemorrhagic jaundice and relapsing fever are rare. *Spirochaeta schaudinni* and *Spironema noguchii* are relegated to the next chapter.

*Chronic inflammatory and ulcerative processes of the skin* (Chapter IV.). It is, however, ulcers that dominate the pathology of the Amazon valley. *Ulcus tropicum* is by far the most common of these. It is an ulcer which spreads rapidly at first, but later becomes almost stationary, though not healing without treatment. It is generally single and on one leg. It reaches a diameter of 4 inches and extends into the subcutaneous tissue. VINCENT in 1896 found spirochaetes and fusiform bacilli in 40 of 47 cases, in enormous numbers especially in the superficial portions of the tissue. These organisms occur also in Vincent's angina, cancrum oris, noma vulvae and in putrid conditions of the ear, bronchi and lungs. An ordinary ulcer contaminated experimentally with discharge from a tropical ulcer and then dressed aseptically, developed a month later phagedaenic characters. Treatment is fairly satisfactory, but the number of treatments in use gives rise to doubt.

*Dermal granulomatous spirochaetosis* is a new form of spirochaetal lesion discovered by the members of the expedition. It takes the form of soft papillomatous masses with a tendency to bleed and ulcerate. Scrapings show agglomerated masses of a new spirochaete, *Spironema noguchii.* Strong, Shattuck and Wheeler, 1926. It is 14–30 $\mu$ long. The spinonemas occur mainly in the epidermis, but also in the dermis, where they produce perivascular infiltration and narrowing of the lumen of the vessels. Fusiform bacilli are absent. Many other kinds of warty dermatitis, including the "mossy foot" condition of THOMAS, await elucidation; in some of these fungi have been found, in others not.

*Granuloma inguinale.*—The authors do not make it clear whether they saw many cases of the condition, but they were unable to cultivate the *Calymmatobacterium granulomatis* of Aragao. In specimens from India which we have happened to examine lately, these organisms were easily found, but there were also present large encapsuled structures containing a mass of material of uncertain nature (? bacilliform).

*Leishmaniasis* (Chapter V). "Espundia" of Brazil, "Uta" of Peru, is not common in Amazonia, and apparently the authors did not see any cases, though they describe *L. tropica* in a papillomatous lesion of 7 months' duration on a woman's thigh.

*Leprosy* (Chapter VI). In Para there are 2,400 lepers, or one to every 100 of the population. In Manaos there are about 400, and in Brazil some 24,000 lepers. Neglect of isolation seems to be almost general, and the picture of unhygienic lack of control is a melancholy one. Of the treatment by the esters of chaulmoogra it is said "that while sometimes beneficial, and very efficacious, and by far the most favourable means yet discovered, is not by any means ideal, and there is still a very great need for a more efficient preparation for the treatment of the disease."

*Malaria* (Chapter VIII). Although the authors state that malaria is the most prevalent and most serious disease of Amazonia, and that the lower Rio Branco is probably one of the worst malarial regions in the world, yet only 4½ pages are devoted to it. Their own observations are exceedingly meagre, and the treatment is indeed disappointing.

*Trypanosomiasis* (Chapter IX). Mal de Caderas, *Trypanosoma equinum* and the capibara are well described; likewise Chagas disease, *Schizotrypanum cruzi*, and the armadillo, but it does not appear that the authors made any personal observations in the matter, as they did not see a case of Chagas disease. They describe, however, *T. legeri* from the tamandua (*Tamandua tetradactyla*).

"Blastomycosis," "Other parasitic infections" and "Pathological conditions produced by Anthropoda" form the subjects of the remaining three chapters of part I. Medical and Economic Entomology forming part II and part III is mainly concerned with the Branco, Uraricuera and Parima rivers.

While we have hinted that the terse but useful epitomes of the work of previous observers rather outweigh the purely original matter, yet the authors are to be warmly congratulated on a very able and interesting report illustrated by numerous good photographs.

J. W. W. Stephens.

MARCHOUX (E.) [Professeur à l'Institut Pasteur.] V.–Paludisme. [**Malaria.**]—*Gilbert & Carnot. Nouveau Traité de Médecine et de Thérapeutique.* 366 pp. With 138 text figs. 1926. Paris: Librairie J. B. Baillière et Fils. 19 rue Hautefeuille. [Price 60 fr.]

This work, which extends to 360 pages and includes 135 illustrations, is a valuable summary of malaria in all its aspects. Professor Marchoux's experience of the study of the disease in the field dates from 1897* and, excepting British India, is almost world-wide. His appointment as French "expert member" of the Malaria Commission of the League of Nations has enabled him to add European to previous tropical experience. One result is that his book appeals equally to those who are attempting to deal with malaria in its endemic centres in Europe and to the hygienist in the Tropics. The chapters on prevention are particularly worthy of attention. They include a reasoned statement of the factors which seem to have been concerned in the partial disappearance of malaria from France, and a critical examination of a number of "anti-malarial campaigns," including those of Sierra Leone, Ismailia, Mian-Mir, Panama, Algeria and Italy. From this analysis it appears that Professor Marchoux is not very hopeful that in malarious localities a great deal can be effected by direct measures based on modern knowledge of the cycle of malaria in men and mosquitoes.

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*E. Marchoux. Le Paludisme au Sénégal. *Ann. Inst. Pasteur.* 1897. Vol. II. pp. 640–62. With 1 plate.

He is disposed rather to advocate indirect methods, and particularly methods which aim at improving the conditions of life, the housing, and the general *bien-être* of the inhabitants. He develops this argument in some detail, taking as an example the problem of malaria in Corsica, which he recently studied in collaboration with Dr. L. RAYNAUD on behalf of the Malaria Commission of the League of Nations.*

The book is well arranged in four chief sections, and the directions for practical work in the laboratory and in the field show a first-hand knowledge of the subject in many countries. The history of the discoveries which have been made in connexion with the parasite and its evolution in the mosquito is fully given, and here, as in other sections of the book, the author shows a wide acquaintance with the literature in all languages. This feature makes the book useful as a handy volume of reference even for research workers, but its particular appeal is evidently to students and to medical men and malariologists in general.

S. P. James.

LOISELET (J.). [M.I.C., Ancien Professeur à la Faculté française de Beyrouth, Professeur de Parasitologie à la Faculté libre de Lille.] Vade-mecum de Parasitologie. [**Vade-Mecum of Parasitology.**] —153 pp. 1927. Paris: Librairie E. le François, 91, Boulevard Saint-Germain.

This little volume, weighing a bare seven ounces, represents parasitology in quintessential condensation. Here—if the metaphor may be changed—we find, clothed in uniform brevity and precision of language, the memorable facts regarding parasites, and the lesions and diseases with which they severally are conjoined, orderly ranked in five battalions under the natural headings of Spirochaetes, Protozoa, Helminths, Arthropoda, and Mycoses. The proportions of these groups vary—Spirochaetes 10 pp., Protozoa 18 pp., Helminths 40 pp., Arthropoda 19 pp., Mycoses and mycological glossary 47 pp. The object of the book, as stated in the preface, is to refresh the memory of the practitioner, so that in the account of each disease the treatment is included. Taxonomy is observed but not obtruded. There are some who like a Vade-mecum, and to them this one is heartily commended.

A. Alcock.

PAWLOWSKY (E. N.). [Professor der Zoologie und vergleichenden Anatomie an der Militar-Medizinischen Akademie in Leningrad.] Gifttiere und ihre Giftigkeit. [**Poison Animals and their Poisons.**] —pp. xvi+516. With 176 text figs. 1927. Jena: Verlag von Gustav Fischer. [27 Mk.]

This is a useful compilation, though encumbered by a capricious arrangement of its contents, the author having endeavoured to improve upon the natural classification of animals by an art that is as much estranged from nature as it is wrenched from convenience. To take as a fair illustration, his method of treating the venomous and poisonous fishes: information on this interesting subject is not imparted as a continuous story under the natural heading "Fishes," but is sent astray through the book and has to be sought in five separate places, under as many subordinate sections of an insignificant scheme where venomous animals are regimented and brigaded according to the nature of the weapon or the apparatus by which they discharge or impart their venom. Fishes that are armed with a poison spine are to be found in one place in the same series as scorpions, Hymenoptera, and urticating caterpillars; fishes inflicting a venomous bite are found in another place in a series with centipedes, spiders, ticks, bugs, and reptiles; and the strange fishes that have poisonous flesh, the familiar fishes whose flesh is poisonous in certain circumstances, and the fishes having toxic blood have all to be looked for in different parts of the book—and this method of putting asunder the things that nature has joined is applied to all the other Classes of the animal kingdom. Apart from this unprofitable systematization the book may be commended as containing a large assortment of useful and well-documented information in a reasonable compass.

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* Drs. E. Marchoux et L. Raynaud. Le Paludisme en Corse. League of Nations publication C.H. 338. Geneva 1926.

A. Alcock.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

30

# TROPICAL DISEASES BULLETIN

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## HISTORICAL.

França (Carlos). Os Portugueses da Renascença, a Medicina Tropical e a Parasitologia. **[The Portuguese of the Renaissance, [and their Contributions to] Tropical Medicine and Parasitology.]**—*Asoc. Española p. el Progr. d. l. Ciencias.* T.II : Conferencias. (Congreso de Coimbra.) pp. 187–218. Madrid. 1925. (Also printed in *O Instituto*, vol. 73, No. 1, and reprinted separately for the author. Coimbra. 1925. 43 pp.)

In this very interesting address, delivered at Coimbra on June 19th, 1925, will be found numerous references to important historical records which appear to have been almost wholly neglected hitherto. At the beginning the author remarks that it had always seemed to him surprising that Portuguese names figure so seldom in works on the history of science : and when we recall the prominent part played by Portuguese navigators and colonists in the early days of geographical discovery, it seems hardly credible that they should really have left no records of the tropical diseases and tropical parasites which they must so often have encountered. The author therefore turned to the old chroniclers of the voyages and conquests of his countrymen, and was rewarded by finding in their writings numerous references to matters of great interest to students of tropical medicine. Some of these he has collected and annotated in the present discourse.

In the introductory paragraphs brief mention will be found of some of the more notable contributions made to science by the Portuguese in the fifteenth and sixteenth centuries. They added much not only to our knowledge of cosmography—as is well known—but also made many discoveries in the domain of natural history in the narrower sense. " Portuguese participation in the advancement of the sciences during that period was, in reality, enormous." For example, they not only discovered or first described a great many exotic animals (such as the anteater, the sloth, the armadillo, the opossum, the tapir, and the mudfish), but also numerous useful or medicinal plants (such as the sweet potato, manioc, pineapple, copaiva, ipecacuanha, etc.), in whose cultivation and dispersal they also largely assisted. In this connexion the names of Gomes Eanes de Azurara, João dos Santos, Antonio Galvão, José de Anchieta, Gabriel Soares de Sousa, and Garcia da Orta receive honourable mention.

João dos Santos, a Dominican missionary who visited East Africa in 1586, has moreover left us, in the account of his travels (published in Portugal in 1609), an unmistakable and probably the first—description of night-blindness. The disease is recorded as peculiar to Mozambique, where it afflicted Portuguese and natives alike.

João DE BARROS, who sailed with the immortal Vasco DA GAMA on his first voyage to India in 1497, gives a graphic description (published in 1552) of the terrible scurvy which visited their ships when lying off the East Coast of Africa. "... Many were stricken, whereof some died ... Their gums were so swollen, that their mouths could scarce contain them, and they rotted till they cracked and burst, as if the flesh were dead: a thing most pitiful to see. And this affliction we afterwards found to be due to the consumption of meat, salt fish, and ship's biscuit, corrupted by overlong keeping."

Duarte LOPES, who explored the sources of the Nile and visited the Congo in 1578–1587, observed the Guinea-worm (*Dracunculus medinensis*): while Aleixo DE ABREU, in 1623, gave a further account, and described its extraction. He says "this worm is chiefly engendered in the legs of men, where it groweth in length and breadth to the bigness of a thick guitar-string. 'Tis cured by drawing it out, bit by bit, and winding it upon a little stick ..."

The chigger (*Dermatophilus penetrans*) was described by Antonio GALVÃO, onetime governor of the Moluccas (*obiit* 1557); and by Gaspar AFONSO, who went to Brazil in 1596—long before PISO, to whom its discovery is usually attributed. It was also described (in Brazil) by G. SOARES DE SOUSA (1587); and these early records clearly indicate that its original home was the New World. But the Portuguese, in their turn, had learned of it from the South American Indians: and it is noteworthy that in the Tupi language it was called *tungaçù*, which means "big flea"—"which shows that the aborigines had an exact conception of its zoological affinities."*

G. SOARES DE SOUSA (1587) and the Spaniard Nicolau MONARDES DE SEVILHA (1580) have recorded cases, and described methods of cure, of various tropical myiases. "To the physicians of the Peninsula, particularly to the Portuguese, we undoubtedly owe the first accounts of myiasis, and notices of the parasiticidal properties of tobacco."

"*Mal do Bicho*" (=maggot-sickness) is a tropical disease almost exclusively described by early Portuguese writers. It was apparently prevalent, at one time, in Central Africa and in Brazil, and was probably—as Ricardo JORGE (1909) has recently pointed out—"a gangrenous rectitis associated with intestinal myiasis." Aleixo DE ABREU (1623)—who himself suffered from this horrid infestation—and SOARES DE SOUSA (1587) gave vivid descriptions of the disease.

The earliest Portuguese chroniclers have also noted many things (too numerous to mention) about snake-poison and snake-poisoning—their accounts being "of the most extraordinary perfection, and forestalling the discoveries of foreigners at the same and later periods."

Garcia DA ORTA and Gaspar CORREIA, furthermore, made many admirable observations on Asiatic cholera—duly noting such obvious symptoms as thirst and prostration, but not overlooking cyanosis of the nails of both hands and feet. (Several remarkable passages from their writings are quoted.)

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* It is interesting to note that the generic name which has a year's priority over *Dermatophilus* is *Tunga*, given by JAROCKI as "one of the names under which this parasite is known to the natives in South America" [ROTHSCHILD: *Ectoparasites*, 1921, Vol. 1, p. 131; see also this *Bulletin*, Vol. 18, p. 205, where the name JAROCKI appears by an error as JOROCKI.]—Ed.

Some very early Portuguese and Spanish observations on syphilis—of whose New World origin the author was convinced—are next cited: and from among them may be mentioned a little-known passage from José DE ANCHIETA (1560), who tells us that the disease was supposed by the Indians of S. America to have been contracted from certain "hairy caterpillars . . . which they are wont to apply to their genital parts, in order to increase their sexual appetite."

The Brazilian planter G. SOARES DE SOUSA, who died by shipwreck on his way home to Portugal, also refers to yaws (1587), and ascribes its transmission to an as yet unidentified fly (*nhitinga*)—as the author (1921) has elsewhere indicated [see this *Bulletin*, vol. 18, p. 265]: while Dr. João FERREIRA DA ROSA, who went through a terrible Brazilian epidemic of yellow fever (ca. 1684–1691), has left a memorable account of this disease, which "he was the first to describe clearly and exactly."

The foregoing extracts do scant justice to the erudition of the author, and all interested in early records of tropical disease should read his discourse in the original. Those who do cannot fail to find much that will profit and entertain them, though at the same time they cannot fail to feel deeply sorrowful that the author did not live to amplify a story which is here all too briefly outlined.

Clifford Dobell.

BAUMANN (E. D.). Iets over de dysenterie in de zestiende en zeventiende eeuw. [**Notes on Dysentery in the XVI and XVII Centuries.**]—*Nederl. Tijdschr. v. Geneesk.* 1926. July 3. 70th Year. 2nd half. No. 1. pp. 41–59. [Numerous refs. in text and footnotes.]

This is an interesting if (as its title confesses) somewhat disjointed article, containing many useful references and quotations—few of which, however, have escaped the eye of HAESER and other medical historians.

The first few pages are occupied with annotations on various more or less familiar passages in the writings of the ancients—passages which have a bearing not upon the subject of "dysentery," but upon the development of the doctrine of *contagium vivum*. HIPPOCRATES, LUCRETIUS, VARRO, COLUMELLA, and the other classical physicians, versifiers, and farmers, are duly cited: but nothing novel relating to dysentery is disengaged from their often obscure and ambiguous remarks. It is, indeed, as the author says, frequently difficult to discover what the older writers meant by "dysentery." But as he himself nowhere defines the term, and discusses "dysentery" as though it were a single disease—not a mere symptom of several different conditions, as it obviously is—the reviewer has been unable to discover any line of argument (if there be one) running through these preliminary pages. The remainder of the article forms a somewhat discursive commentary upon certain selected publications—chiefly of the sixteenth and seventeenth centuries—relating to "dysentery" in the loosest sense, but containing many interesting allusions from which the following may be extracted as specially noteworthy.

In the sixteenth century there were, apparently, recurrent epidemics of "dysentery"—whatever the term may mean—in Europe; while a pandemic, from which hardly a town escaped, swept the continent in 1538. The Netherlands suffered severely in 1556 and 1580. One writer of the period—FERNELIUS (1497–1558)—ascribed the visitations, in part, to an unknown baleful matter floating about in the air. PIETER VAN FOREEST (1522–1597) [known in his day as "the Dutch Hippocrates"], who wrote about the epidemic of 1556, regarded the disease as infectious when it assumed epidemic proportions; and for it he prescribed opium, hyoscyamus, and mandragora—though only in desperate cases. The great AMBROISE PARÉ (1510–1592) studied a severe outbreak in camp at Amiens (1558), and has left an account of his findings at several autopsies.

A German epidemic (1601–1603) was described by HILDANUS. Discussing the spread of infection, he says that it is dangerous for a healthy person to come in close contact with a dysenteric, or to use the same privy; and he advocates the disinfection of dysenteric stools with quicklime—though he did not, apparently, invent this method.

PASCHETTUS recorded an epidemic of dysentery at Genoa in 1604, and another Italian—FONTANUS (1612)—has left us a description of the *postmortem* examination of a child dead of the disease [which reads very like a case of *amoebic* dysentery].

Among French writers, LE POIS (1623) and DE LAMONIÈRE (1625) are specially noted. The latter gave a long account of the "nature, causes, and remedies" of dysentery, and remarked the occasional complication of liver-abscess. Somewhat later VAN DEN HEYDEN (1643) described an epidemic which broke out in Ghent in 1624. This writer regarded dysentery as infectious, and treated his patients by methods which seem by no means inappropriate for the alleviation of the bacillary form. Notable accounts of the 1624 epidemic were also published by the Dutch physicians VAN BEVERWIJCK (1660) and VAN DER MYE (1627), while SENNERT described an outbreak in the same year (1624) in Germany. Various views expressed by all these writers are recapitulated.

Later in the century WILLIS, SYDENHAM, and MORTON made their celebrated observations in England, and recorded their several opinions. These are briefly reviewed and illustrated. [The author does not mention, however, SYDENHAM'S memorable definition of (bacillary) dysentery as "a fever turned inwards upon the guts."]

The author finally treats of "tropical dysentery" (pp. 56–58), referring especially to various *loci classici* in the works of BONTIUS (1592–1631) and PISO (1611–1678), and devoting a few lines to ipecacuanha and its introduction into Europe. But he merely touches upon the fringe of this complicated and difficult subject, while reciting PISO'S famous panegyric on the "*salutifera et celeber radix.*"

As a result of his studies the author concludes that the sixteenth and seventeenth century writers on dysentery effectively contributed to our knowledge of infection and infectious diseases, and also to the development of the doctrine of *contagium vivum*; though he notes that, while the Arabians regarded dysentery as infectious, FRACASTORIUS—much later—did not so much as mention it in his well-known disquisition on contagion. AVICENNA was already aware that peritonitis might follow a dysenteric perforation of the intestine: PARÉ directly observed dysenteric ulceration of the colon: HILDANUS recognized that localization of pain in the belly and lesion in the gut are not necessarily coincident: DE LAMONIÈRE knew that dysentery might be associated with abscess of the liver. Finally, the seventeenth century gave us ipecacuanha—"*benedicta illa radix . . . praestans remedium . . . qua nullum praestantius aut tutius*"—as an approved remedy for the bloody flux.

Clifford Dobell.

BAUMANN (E. D.). Bijdragen tot de geschiedenis van de dysenterie in de achttiende eeuw. **[Contributions to the History of Dysentery in the XVIII Century.]**—*Nederl. Tijdschr. v. Geneesk.* 1926. Oct. 2. 70th Year. 2nd Half. No. 14. pp. 1520–1534. [Refs. in foot-notes.]

These historical " contributions " to the subject of " dysentery " are, apparently, not so much those of the author as of two English writers of the eighteenth century whose names are not unknown to students of the history of tropical medicine. The paper is, in fact, a sort of discursive and belated review of CLEGHORN'S *Observations on the Epidemical Diseases in Minorca* (1751) and PRINGLE'S *Observations on the Diseases of the Army* (1752)—with special, but by no means exclusive, reference to their accounts of dysentery. Various passages from these two classical works are reproduced and annotated, with frequent digressions into side-issues which are but remotely connected with the subject proper. (Some of these excursions are interesting enough, however—especially the author's notes on ancient army medical services and the origin of " the Red Cross idea.")

In his comments the author makes no attempt to interpret the words of either CLEGHORN or PRINGLE in the light of modern knowledge, and compares their observations with those of HIPPOCRATES and PLINY rather than with those of present-day investigators. For this reason his paper adds but little to what is already known—and has already been treated of at large by other writers—regarding the history of " the Bloody Flux."

Clifford Dobell.

HAUGHWOUT (Frank G.). **Woodward's Monograph on the Alvine Fluxes: a Forgotten Classic in the American Literature of Tropical Medicine.**—*Jl. Philippine Islands Med. Assoc.* 1926. July. Vol. 6. No. 7. pp. 218–223. [2 refs.]

The monograph is: 1. Medical and Surgical History of the War of the Rebellion. Part II. Vol. I. Medical History. Being the Second Medical Volume. Prepared under the direction of Joseph K. BARNES, Surgeon General, United States Army. By Joseph Janvier WOODWARD, Surgeon, United States Army. First Issue. Washington: Government Printing Office. 1879.

The author of this paper describes it as good to look on as an example of the printer's and engraver's art. Though written nearly half a century ago, it stands pre-eminent as a monograph, giving with rare completeness and accuracy the development of knowledge of dysentery, from which much useful information applicable to-day may be derived. Its 800 pages of solid fact and discussion are embellished by 51 plates and 44 text figures of surpassing execution.

The author was surprised to find how often WOODWARD'S observations had anticipated much that is now regarded as of recent development. Medical experience remains constant. WOODWARD wrote:—

" Not only do the Alvine Fluxes usually cause more sickness and mortality among troops during war than any other group of diseases, but this circumstance affords a better opportunity for their study than can commonly be obtained in times of peace, so that it has heretofore happened that many of the most important accounts of these disorders, whether in ancient or modern times, have been the fruit of military experience"

One has only to consult the medical literature published since 1915 to see the truth of this. For the author, WOODWARD to-day sits on the Olympus of American medicine.

H. M. Hanschell.

MACARTHUR (W. P.). **Old-Time Plague in Britain.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Jan. 21. Vol. 19. No. 7. pp. 355–371; also in *Jl. Roy. Army Med. Corps.* 1926. Dec. Vol. 47. No. 6. pp. 401–417.

Versed in curious history and old monastic chronicle, and aptly inspired by the poets, the author has staged here a panorama of Plague in Britain, where, as in the pages of Defoe, but in the exacter focus of science, we see affliction and agony in their feature, desolation in her own image, and the very atmosphere of the time in its lurid gloom and pressure. The lessons drawn from the story may not be entirely new, but they are not yet generally realized and understood, nor have they ever been expressed with such originality and distinction. Here we find ample historic illustration of the fact that from very early times in Britain, up to the end of the seventeenth century, plague must have been one of the endemic diseases of the land, and that the "Great Plague," so called, of 1665 was but the last of a long succession of its furious outbursts, some of which were sufficiently calamitous to have persisted as vividly in the memory of our earlier forefathers as it of 1665 did in the mind of later generations. Here, also, we get some striking illustration of the insanitary horrors of town-life in old England—particularly the familiar hordes of black rats and the dirt-whelmed lath-and-plaster houses that the unconcerned inhabitants shared with these exorbitant brutes and their parasites—horrors which provided all that was necessary for periodic explosions of the dormant infection. Here, too, it is well explained how this country got rid of plague—essentially a town-bred disease—by the awakening of a sanitary consciousness and the creation in towns of a sanitary environment repugnant to the house-haunting black rat. Incidentally, we find here well explained the lesson that the danger of a particular species of fleas is to be appraised not so entirely by the single fact that it is susceptible to plague-infection as by an adjunct knowledge of its relations to its specific host, of its habits and proclivities apart from that host, and of the habits and necessities of its larva; while from old Scottish records read in the light of to-day the author shows that hen-fleas have acted—or at least have quite justly been said to have acted—in spreading plague in its most violent outbreaks.

These are the author's principal lessons—illustrated and impressed with an uncommon grace and erudition, and with many a winding bout of aptly-linked commerce with the poets. In unfolding them he first clears his course with a concise review of the relevant bionomy of fleas, and then follows on with the story, as far back as it can be traced, of the introduction of plague into Britain through continental Europe. In accord with custom he begins with the plague that reached Europe, A.D. 543, in the reign of Justinian, as the first *authentic record of bubonic plague* on the Continent. [This is the first record of bubonic plague in Europe, diagnosed and described by a contemporaneous physician, and the author may therefore, perhaps, be justified in excluding the unknown pestilence, comparable in its devastations with the Black Death itself, mentioned in Gibbon as having, between

A.D. 250 and A.D. 265, swept steadily through every province and city of the Roman Empire, entirely depopulating many cities, and as having, when it fell on Rome, carried off for some time there 5,000 persons daily.] The author considers with reason that the plague of Justinian must have spread to Britain, since, although it is not mentioned in the *Anglo-Saxon Chronicle*, it certainly reached Ireland, where he finds it recorded by the Irish chroniclers as bubonic plague, and as having destroyed "the noblest third of the human race." The first written record of plague in England occurs (A.D. 664) in the *Anglo-Saxon Chronicle*; this "pestilence" is mentioned also in BEDE'S *Ecclesiastical History*, where it is said to have done no less harm in Ireland than in England, and it may therefore, according to the author, be identified with concurrent Irish records of bubonic plague. After a cursory notice of other references to "plague" in the *Anglo-Saxon Chronicle*, the author gives a moving account of the "Black Death," the best contemporary description of which awful calamity is, according to him, that composed by a Franciscan friar of Kilkenny, John CLYN, who wrote as one—in his own pathetic words—"*inter mortuos mortem expectans*," and verily seems to have laid down pen and life together, since, as we here learn, his annals break off abruptly and are rounded with the cold statement, in different handwriting, that "here the author died." A cursory notice—with interesting commentary and some romantic allusion—of the great epidemic outbursts of the fifteenth and sixteenth centuries, in one of which (1625) the recorded deaths from plague in London rose to 4,000 a week, leads up to an instructive account of the culminating epidemic of the last tricennium of the seventeenth century, commonly but with intolerable laxity known as "*The* Great Plague of *London*," and an equally instructive discussion of the also much misunderstood manner of its extinction. And so, with a heart-searching conjuration to a world where the solemn words of the old familiar petition for divine deliverance "from plague and pestilence" have long ceased to be a motive and a cue for passion, and with a last mournful invocation of the stricken shade of poor Friar John of Kilkenny, *inter mortuos mortem expectans*, ends a discourse of which we may follow the outline and indicate the scope, but cannot abstract the tone and temper or the nice literary embellishment and scholarly antiquarian grace.

A. Alcock.

ICHOK (G.). La peste dans le passé et à notre époque. [**Plague in the Past and in our Time.**]—*Presse Méd.* 1926. Dec. 25. Vol. 34. No. 103. pp. 1627–1629. [6 refs.]

To throw into relief the victories of preventive medicine, and to show, at the same time, the campaigns still to be waged, Professor Ichok reviews briefly the history of plague in Europe, and then goes on to define the present world-distribution of the disease. He touches on the Plague of Justinian, the Black Death, and so forth, covering well-known ground, but devotes most space to the epidemic of plague, for so he identifies it, which raged in Athens 430 B.C. The reviewer is aware that the nature of the Pestilence of Athens has been discussed in the past—just as it will probably be the subject of debate in the future—but he has avoided reading any of the arguments on this point, so as to be able to consider THUCYDIDES' narrative, as given by JOWETT, uninfluenced by the opinion of others. The reviewer believes that the epidemic undoubtedly was typhus fever. First, the circumstances of the Athens Pestilence were precisely those in which typhus breaks out. There was war, and famine; the country people flying before the ravaging Peloponnesian army swarmed into the city, aggravating its misery. Finding no other shelter, they crowded into stifling huts, and thronged even the temples. If the Athenians escaped typhus under these conditions their experience must be unexampled in the history of Europe.

However, to return to the symptomatic account* of THUCYDIDES, who himself "was attacked, and witnessed the sufferings of others." He describes a sudden onset with violent headache and with redness and inflammation in the eyes. The throat and tongue "were quickly suffused with blood" and the breath became foul. There followed sneezing and hoarseness, violent cough and distressing bilious vomiting. The body externally was not very hot to the touch, but of a livid colour inclining to red, and breaking out in pustules [*φλύκταινι*, or blisters] and ulcers. There was intense internal fever and wild delirium, so that many who were unguarded threw themselves into cisterns of water. An intolerable restlessness never left them. Those who expired on the seventh or ninth day had their strength unabated, and died of internal fever. In those who survived this, the disease descended into the bowels, and there produced violent ulceration with severe diarrhoea and an exhaustion which finally with few exceptions carried them away. If a person got over the worst, the disease often attacked the fingers and toes, destroying these, and some lost their eyes. Others on recovering were seized with a forgetfulness and knew neither themselves nor their friends. If an ordinary sickness attacked any, it ended in this pestilence. Contact with the sick was the principal cause of mortality; the physicians themselves were among the first victims because they most often came into contact with the disease.

There is little here to suggest plague, no mention of buboes, though these were known to the ancient Greeks; moreover, most cases of intense plague terminate fatally within five days.

An abrupt onset with redness of the eyes, as described, is of course usual in typhus. The reviewer is uncertain what to infer from the throat and tongue becoming "quickly suffused with blood"; there are no throat lesions peculiar to typhus, though oedema of the glottis, ulceration and necrosis occur occasionally in the course of the disease; one epidemic of typhus at the end of the seventeenth century is described as commonly characterized by a severe inflammation of the throat, ending in sloughing, the complication attaining its maximum severity at about the height of the petechial eruption.

Hoarseness is common, as are severe cough and vomiting, though forming no essential part of the symptomatology; even in the relatively mild type of typhus encountered by the Polish Commission (13 per cent. mortality), exhausting cough and severe vomiting were common symptoms. Some writers even mention a "bilious type" of the disease.

The body with intense internal fever, but not hot to the touch, is indicative of typhus, for in severe infections the temperature may fall without any amelioration of symptoms, and although the flushed skin and dull heavy facies of the patient suggest high fever, his temperature is normal.

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* Jowett's *Thucydides*, I., 125.

"Pustules and ulcers" may stand for sloughing parotid or submaxillary glands, or for gangrenous patches of skin; if the word translated in JOWETT's text by "pustules" was employed in its primary sense of blisters, these might well be the raised white miliary spots, quite distinct from the petechial rash, described so often in the eighteenth century.

Wild delirium, resistance to ministrations and attempts to escape out of doors are all to be expected in severe typhus before the patients subside into coma, or into coma-vigil—that "restlessness which never left them." As regards the intestinal complications described by Thucydides, thus PRINGLE in his account of the ghastly epidemics of typhus in the War of the Austrian Succession: "the intestines more particularly are disposed to mortify as few die without cadaverous and involuntary stools." Gangrene of the extremities is too frequent a complication of typhus to require comment.

The loss of sight may have been due to corneal ulceration, cataract, optic atrophy, or possibly to the occasional abscesses of the orbit. As a result of these complications, certain of DANIÉLOPOLU's Roumanian cases had their vision reduced to vague perception of light. Of such lesions in the Seven Years War, Donald MONRO wrote: "The Inflammation frequently rose to a great Height and left an Obscurity or Philm over the Cornea, which remained an Impediment to the Sight not to be removed."

Loss of memory and various other psychical abnormalities are a striking peculiarity of the typhus convalescence, and those affected may afterwards retain absolutely no recollection over some lengthy period during which they had appeared quite rational and sane.

The remaining sentences of the abstract record experiences so universally true of typhus that they might be applied indifferently to any epidemic of "the pestilential spotted fever" that has ever raged.

W. P. MacArthur.

COUDRAY (F. E. C.). Notes épidémiologiques du passé. La peste à l'armée d'Orient de la 1re République. [**Plague in the Army of the East of the First Republic.**]—*Arch. Méd. et Pharm. Milit.* 1926. Oct. Vol. 85. No. 4. pp. 387–403.

NAPOLEON's Egyptian campaign was an undertaking arduous enough without the added harassment of persistent bubonic plague. The author of this paper does not attempt to give a detailed account of the epidemic, only drawing on its history to illustrate the character of DESGENETTES, Napoleon's principal medical officer, and to define his position as an organizer and as a sanitarian. DESGENETTES' main preoccupation was to protect the Army of the East against disease coming from without, and his arrangements towards this end would not discredit a hygienist of to-day. A special sanitary organization watched the ports; bureaus of hygiene were established over the country to keep him informed on the epidemic state of their districts. In spite of these precautions plague broke out, and from first to last attacked one-sixth of the force. DESGENETTES made vigorous efforts to limit the range of the epidemic; he transformed a large mosque in Alexandria into an observation hospital for suspected cases, organized two special hospitals for the definitely infected, and isolated the half-brigade of infantry most seriously involved. At this point an expeditionary force of 15,000 men, all free from any sign of plague, was despatched to Syria, with NAPOLEON himself, accompanied by DESGENETTES, in command. At Jaffa plague broke out in the detached force; the special hospital filled so rapidly that another was organized forthwith. Most of the men attacked died in 5 days or less. So great was the panic that the dreaded word "plague" was barred and replaced by various euphemisms. NAPOLEON visited the plague hospitals—a most hazardous act according to the ideas of the time—and remained for a long time talking to the sick. Finding himself in a small and overcrowded room, he alarmed those responsible for his safety by helping to raise the corpse of a soldier whose rags were fouled by the discharge from a bubo. Here, too, DESGENETTES performed his famous "*geste*" of dipping his lancet into a suppurating bubo and then pricking himself in the groin and axilla with the contaminated blade. He escaped with no more serious result than local inflammation at the sites of inoculation, and his display of contempt for the disease had a very heartening effect on the despondent and sorely-tried troops.

On returning to Cairo, DESGENETTES set up an Extraordinary Commission of public health, with authority to issue any orders considered necessary—subject to the commander-in-chief's approval; the country was subdivided into districts, each in charge of a public health committee working under the direction of the central body. The organization was excellent, but executive measures based on erroneous etiological conceptions were bound to fail, and in spite of prompt notification, rigorous isolation and so forth, plague persisted for the whole of the campaign. The epidemic did not determine the issue in Egypt, for NAPOLEON's dream of conquest there ended with the Battle of the Nile; none the less, the sufferings and losses of the Army of the East may well have had some effect on his later fortunes. The author considers that by reason of the depth of their devotion, and of the magnitude of their services, the names of DESGENETTES and LARREY should be held in equal reverence.

W. P. MacArthur.

D'IRSAY (Stephen). **The Black Death and the Medieval Universities.**—*Ann. Med. History.* 1925. Vol. 7. pp. 220–225. [42 refs.]

In the fourteenth century the medical teaching of the universities was based on the elaborate system of philosophical speculation known as scholastic medicine. The attitude of the official medical theorists when confronted with the greatest pestilence that ever afflicted mankind, forms the subject of this scholarly paper. When the Black Death reached Paris in the autumn of 1348, the Faculty of Medicine in the University, on the request of the King, issued an official pronouncement concerning the epidemic. The cause is traced to various cosmic and telluric influences—the conjunction of Saturn and Jupiter, Mars was in the sign of the Lion, with consequent corruption of the air with evil vapours, and so forth. Here the imagination, trammelled only by the prescripts of the Fathers, has full play. But the inadequacy of the system becomes still more evident when the Masters of Paris turn to the symptoms and diagnosis of the disease. Observation is completely evaded. If we wish to know something of the actual manifestations of the plague, then we must learn not from the doctors of physic, but from poets, monks and painters whose wits were unclogged by theoretical preconceptions. One tiny gleam of light penetrates the obscurantism of the *Consultatio*: vinegar is advocated as a powerful antiseptic. Why? Not because "*sicut dixit Avicenna,*" but for the amazing reason—Experience tells us that it is of wonderful use! In spite of this sign of a dawning intelligence, the hand of dead and gone systematists continued to control official medical teaching for many a long day; none the less, the Black Death "brought home to great numbers of physicians that observation and empiric judgment is a legitimate method in dealing with medical problems."

W. P. MacArthur.

ALLYN (Herman B.). **The Black Death. Its Social and Economic Results.**—*Ann. Med. History.* 1925. Vol. 7. pp. 226–236. [9 refs.]

This paper discusses the effects of the tremendous mortality from the Black Death on industry, customs and morals in England. After the pestilence there was such a shortage of labour that the villeins, hitherto bound to the soil, deserted their manors and demanded wages so high that sometimes the wage bill exceeded the price received for the harvest. Moreover, the cost of everything that the landowner had to buy increased by from 50 to 200 per cent. Attempts to control the economic upheaval by legislation failed to accomplish their object, and the bitter struggle between owners and tenants led gradually to a fundamental change in land tenure, so that leases took the place of labour services, and thus the old feudal system came to an end.

The author quotes GASQUET'S estimate that 5,000 beneficed clergy died of plague, and that the total death-roll of the clerical order amounted to some 25,000. The vacancies were filled by young, inexperienced and often ill-educated clergy who exercised little restraining influence on the people, and so were ill fitted to combat the outburst of immorality and licentiousness which followed the pestilence. The failure of the new clergy to inspire confidence in their spiritual leadership resulted in a weakening of the Church's authority, and, though the point is not made in this paper, prepared the way for the ultimate Protestant revolt.

According to the author, the Black Death "contributed not a little" to the substitution of English for French as the national language of this country, but his argument is not convincing. He states that time and separation led to great corruption in the French in common use. As evidence of this he cites Chaucer's Prioress who spoke French:—

"After the scole of Stratford attë Bowe,
For Frenssh of Parys was to hire unknowe."

The tongue that the Prioress spoke "ful faire and fetisly" was no more corrupt French than Lowland Scots is corrupt English. The "scole of Stratford attë Bowe" was a Benedictine convent where, as in similar institutions, the old Norman-French idiom was retained, whereas "Frenssh of Parys" was the speech of what one may call the smart set. The lady's adherence to Norman-French was in keeping with her expressed distaste for Court fashions. As a matter of fact, English had been gaining ground at the expense of French for over 140 years before the Black Death; at the time of the pestilence schoolboys already had begun to construe their Latin into English instead of

French, and finally the national spirit aroused by Edward III's victorious wars—begun before the Black Death—led to the adoption of English as the language of the Court. English would have displaced French just as surely if never an Englishman had died of the bubo-plague.

The author "has no doubt" that the Black Death got its name from the petechiae, etc., shown by so many of its victims. It is not too much to ask for some evidence for this assertion. So far as the reviewer is aware, "*Pestis Atra*" is a mere variant of the more common *Mortalitas Magna*. *Ater*, he believes, was never used at this period to mean black-coloured, but only in the sense of "terrible," like the *Dies Atri* of the ancient Romans. "*Niger*" is the adjective employed in contemporary chronicles to describe the colour of the petechiae, not *Ater*. Up to the present the reviewer has failed to find any evidence that the name "The Black Death" was employed in England either at the time of the epidemic, or during the next 200 years. Even in Stow's 1603 edition of his *Survey*, the Black Death appears only as the "great pestilence in the time of Edward the third."

Although the author brings forward no new matter, and is content to take most of his material at second-hand, he has written an instructive paper for the general medical reader.

W. P. MacArthur.

SCHADELBAUER, Jr. (Karl). Die Sterzinger Pestordnung vom Jahre 1534. [**The Sterzing Plague Ordinance of 1534.**]—*Arch. f. Geschichte d. Med.* 1926. June 15. Vol. 18. No. 2. pp. 192–196.

Plague was rife in Europe during the fourth decade of the sixteenth century; in London the epidemic of 1532 led to the first issue of the Bills of Mortality. Another outburst in 1535 postponed the opening of Parliament, and kept Henry VIII and Thomas Cromwell long from the capital. Venetia and Lombardy were ravaged in 1536, a bad plague year all over England also. The Tyrol was especially liable to epidemic invasion from its position as a highway of communication between Italy and Germany, and the district suffered severely from plague in 1534. In this year the authorities of the Tyrolese town of Sterzing enacted an "Ordinance during the mortal Duration (*sterbendn Leuffn*) of the Pest." The decree consists of a short preamble and fourteen arricles which the author of this paper transcribes in the wording and spelling of the original text. In the Ordinance, the Burgomaster and Council direct, under penalties, that a solemn procession of all the townsfolk and their households be undertaken devoutly and meekly, "the males walking apart and the females apart also," and when the noon bell rings each and all, young and old, shall kneel down and beseech Almighty God to turn aside the punishment of this grievous plague. Provision is made for the establishment of a Friary (brother-house) in a convenient spot, sick persons to be brought thither during the night or in the late evening or in the early morning so that terror may not be aroused. A specially appointed blood-letter (*Lassl**) will bleed and physic those who are needy and deserving of his care. Infected houses are to be quarantined, and the contacts isolated therein for 30 days reckoned from the last exposure to infection.

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* It is explained that the *Lassl* was the highest sanitary officer; with him were associated the *Ordinatores*, the chief supervisory body and the *Zuettrager*, whose duties consisted principally in the supplying of food, drink, etc.

One or two persons are appointed to convey food to those so confined, and others to wait on the sick ; each Friday in the churches collections are to be made for the maintenance of the infected poor. No one recovered from plague shall go into the public bath (*vailpad*) within six weeks, be it woman or man, young or old, under heavy penalties. Innkeepers or other persons are forbidden to harbour wittingly any who come from cases which have ended fatally ; further, during this alarming visitation, on no account shall beggars be allowed to go from house to house. Since the loud jolting of the dead-carts has occasioned horror and dread in the past, henceforth a light cart fitted with a box (*Truchn*) and with muffled wheels, shall be employed ; the dead to be removed and buried late in the evening, at night or in the early morning and not when the people are going about the streets. No dead or sick cattle shall be left lying about or unburied in the neighbourhood of the town, whereby in the past the air has been corrupted.

It will be noticed that the Ordinance resembles generally the English Plague Orders of the period ; the quarantine of houses, isolation of contacts, provision for the sick poor and exclusion of strangers from infected localities, are all familiar. During one London epidemic a gibbet was " set up in the market-place of Windsor to hang all such as should come there from London." Some of the Scottish decrees were even more drastic ; the magistrates of Aberdeen directed the erection of three gallows in specified spots, " that in case ony infectit person arrive or repair by sea or land to this burgh, or in case ony indweller of this burgh receive, house or harbour, or give meat or drink to the infectit person or persons, the man be hangit and the woman drownit."

The English Orders, unlike that of Sterzing, recognize the agency of animals in conveying plague, and make provision for the destruction of cats and dogs. These animals were believed to spread the disease by carrying infection in their coats and hair. The English regulations regarding plague interments differed too, as at this period night burials were forbidden ; but during the next century, seemingly after the Great Plague of 1625, the procedure was reversed and plague burials were permitted only during the hours of darkness, until at the height of the plague of 1665 the brief summer nights proved too short to bury the enormous numbers that died daily.

In the above abstract of the Sterzing Ordinance the reviewer has given the substance of its more interesting provisions ; anyone wishing for further particulars concerning the decree should consult the original paper.

W. P. MacArthur.

LAGRANGE (E.). **Concerning the Discovery of the Plague Bacillus.**—*Jl. Trop. Med. & Hyg.* 1926. Sept. 1. Vol. 29. No. 17. pp. 299–303. With 3 text figs. [14 refs.]

The author was at Nha-Trang (Indo-China) as an assistant to Dr. YERSIN. " In June, 1894, KITASATO, then head of a Japanese Commission, and YERSIN, a French doctor, came to Hong Kong to study plague. Within an interval of a few days both claimed that they had discovered the aetiological agent." The author describes the work done by these two men and shows how it came about that *B. pestis* became known as YERSIN's bacillus.

J. H. Tull Walsh.

HUME (Edgar Erskine). **Max von Pettenkofer's Theory of the Etiology of Cholera, Typhoid Fever and other Intestinal Diseases. A Review of his Arguments and Evidence.**—*Ann. Med. History.* 1925. Vol. 7. No. 4. pp. 319–353. With portrait & 5 other figs. [286 refs.]

Max PETTENKOFER was a Bavarian born at Lichtenheim on December 13th, 1818, one of a family of eight children. The boy's future was decided by his uncle, Dr. Franz X. PETTENKOFER, a chemist of note and court apothecary, who took Max into his home and became responsible for his education. Max completed his scholastic course with distinction in 1837 and entered the University of Munich, where he undertook the study of chemistry. He possessed imagination and an inclination for writing verses, sonnets, a collection of which was published forty-nine years later. Later he entered the Medical Faculty. He, however, preferred chemistry and while still a student wrote papers on the value of Marsh's test for arsenic and antimony. In 1843 he received the Degree of Doctor of Medicine and Surgery with a thesis on *Mikania Guaco* from which guacin is derived. He did not practice as a doctor, but confined his attention to chemistry in its relation to medical matters. He went to work under Josef SCHERER at Würzburg and carried out researches, demonstrating hippuric acid in the urine and the end product of the creatin of the muscles. The most important work was the discovery of " Pettenkofer's test for bile," useful to physiologist and physician. In 1844 Max was able to go to Giessen to study and work under LIEBIG, and there he would gladly have remained but for lack of funds. Forced to get some paid work he obtained a place in the royal mint on a very small salary. He also carried on his own work and showed that the saliva contained sulphocyanic acid. At the end of 1847 PETTENKOFER became professor of medical chemistry in the University of Munich, with a salary of 700 gulden in money, two measures of wheat and seven of rye, per annum. He lectured on chemistry in relation to diet, general physiology and sanitary hygiene, and in 1865 adopted the title " Lectures on Hygiene " for his course of instruction. Dr. Franz PETTENKOFER died in the year 1850 and Max PETTENKOFER was appointed court apothecary. In 1853 he was appointed ordinary professor of medical chemistry in Munich, and in 1855 was given a suite of rooms in the new Physiological Institute where he continued his good work on all the subjects connected with Hygiene. He published many papers. In 1865 PETTENKOFER and VOIT founded the *Zeitschrift für Biologie* in which PETTENKOFER'S works for the next eighteen years are collected. In 1872 Max von PETTENKOFER was ennobled and invited to go to Vienna as professor of Hygiene; but he consented to remain in Munich where the Bavarian Government agreed to build a " Hygienic Institute " similar to the one in Vienna. This institute was opened in 1878 and students from all countries came to study under von PETTENKOFER who, during ensuing years, did great work and received several medals and honours. His life ended February 10th, 1901.

We now turn to Max von PETTENKOFER'S theories of the etiology of cholera and other intestinal diseases which at that time were new. Briefly stated an epidemic of cholera was due to: (1) A specific germ; (2) certain local conditions; (3) certain seasonal conditions; (4) certain individual conditions. His own investigations were concerned chiefly with the second and third of the above conditions and when in 1883 KOCH demonstrated the "comma bacillus" PETTENKOFER at once accepted the work as confirming the first condition of his theory. A full Bibliography of publications by PETTENKOFER is given at the end of Major Hume's interesting Biography.

J. H. T. W.

STOCKMAN (Ralph). **James Lind and Scurvy.**—*Edinburgh Med. Jl.* 1926. June. Vol. 33. No. 6. pp. 329–350. With 1 plate. [20 refs.]

The author has gathered together almost all the available information regarding the history and work of Dr. James LIND who, though comparatively little known, achieved much, but the value of his work was not fully recognized during his life. He, however, is honoured in the Navy, for the welfare of which he laboured so continuously. In his fight against scurvy, as the author states, the mere fact that he almost eradicated the disease made his work soon forgotten, for scurvy ceased to become a crying evil, medical interest passed, and LIND was forgotten.

He was an original and independent worker, testing everything by experiment or by careful deduction from soundly ascertained facts, but he had not the "suaviter in modo" that brought such success to the second great Naval hygienist, Sir Gilbert BLANE, by whom most of LIND'S recommendations were put in force. A curious sentence of LIND'S is quoted which explains much: "The Province has been mine to deliver Precepts, the Power is in others to execute them." It must be understood that hygienic conditions in the Navy in LIND'S time were deplorable, and the evolution of better and healthier conditions for all those that went down to the sea in ships was woefully slow. The seamen had then few powerful friends and were, as now, badly in need of more.

The author describes an interesting "dark age" in the treatment of scurvy which was due to the much lauded "De Morbo Scorbuto Libor" by a Dutchman, Severinus ENGALENUS, 1588. This book which was apparently a tissue of falsehoods exerted a widespread influence and changed the whole medical conception of scurvy, so easy was it to influence the medical world then as now. In the early part of that century the disease was fairly well known and rightly treated, being not uncommon in general practice both afloat and on shore. In 1817, WOODALL, in "The Surgeon's Mate," advised the use of the juice of lemons both for cure and prevention, but it was LIND'S "Treatise on the Scurvy," 1753, and his subsequent works which definitely placed prevention and cure upon a scientific basis. LIND also showed how to provide pure water by distillation in ships, and gave good advice regarding the prevention of malaria and the general hygiene of ships. There is much more of interest in this history which is well told and to which useful references are given.

P. W. Bassett-Smith.

VAN DORSSEN (J. H. M.). De koortsepidemie te Cheribon in 1805. **[The Epidemic of Fever at Cheribon (Java) in 1805.]**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 4. pp. 461–501. With 1 plan. [Refs. in footnotes.]

Van Dorssen publishes a full account of the report on this epidemic, delivered by Isaäc DOUGLAS, chief surgeon in the service of the East Indian Company. The report is rather prolix, especially in the introductory part dealing with supposed telluric and cosmic influences on the health conditions at Cheribon in general.

The fatal epidemic of 1805 lasted from July till December, but made a number of victims in the beginning of 1806. It is estimated that approximately three-quarters of the population of Cheribon died from the disease, which, probably rightly, is considered by van Dorssen to have been a malignant form of subtertian malaria, though many cases of typhoid fever and dysentery may have occurred at the same time. DOUGLAS's description is not very clear, for which fact the varying symptomatology of subtertian fever may account; he does not report upon the condition of the spleen. No beneficial action was seen of cinchona bark, the dosage of which, however, is not reported and may have been insufficient for the purpose.

The epidemic occurred during a very hot dry season, which followed an unusually long rainy one. It had a very local character and was not spread in the vicinity by patients who had fled from the afflicted town. A short time passed at Cheribon was sufficient to acquire the disease. The incubation period of one or two days, noted in such cases, if well established, justifies some doubt as to the malarial character of these cases and perhaps of the whole epidemic. Some remembrance existed among the population of similar epidemics in the past, but DOUGLAS's assumption that such occurred synchroneously with vulcanic eruptions is wrong, according to information from other sources.

The report gives a vivid impression of the unhygienic conditions existing in a tropical town about one century ago, and of the dreadful state into which such a town was brought by an epidemic.

W. J. Bais.

HONIG (P. J. J.) & SWELLENGREBEL (N. H. H.). Bijdrage tot de geschiedenis der malaria in Nederland, tweede mededeeling: een onderzoek naar de gegevens, waarvan men zich bedient ter herkenning van de door plasmodiën veroorzaakte koorts in de geschiedkundige overlevering. **[Contribution to the History of Malaria in Holland. Second Communication: An Investigation into the Value of the Data usually applied for the Recognition in Historical Accounts of Fever caused by Plasmodia.]**—*Nederl. Tijdschr. v. Geneesk.* 1926. Sept. 4. 70th Year. 2nd Half. No. 10. pp. 1104–1120. With 3 maps in text. [Refs. in footnotes.]

Epidemic fevers, sometimes causing a considerable mortality, and known as "autumnal," "bilious," or "marsh" fever, are well known in medical history. The description of such epidemics is, however, often vague and does not allow the current identification of those fevers with what is at present understood by malaria, i.e., fever caused by plasmodia. Identification was believed to be justified if the fever:

(1) Was of an intermittent type; (2) could be cured in a short time by means of cinchona bark or quinine; (3) caused a considerable enlargement of the spleen, especially after repeated relapses; (4) was inclined to relapse; (5) was apt to occur in special seasons of the year; (6) in its malignant type caused a high mortality of children; (7) was more malignant to foreigners than to the inhabitants of the endemic region; (8) was non-contagious; (9) more common in the country than in the towns; (10) occurred in the vicinity of swamps; (11) could be combated by measures, suitable, according to our modern views, to eradicate the causes of malaria.

The authors produce a wealth of evidence from which it follows that the terms used by our predecessors often will not fit into the frame of our modern terminology and that many of their assertions may have been influenced by theoretical postulates or prejudices. The identification of those historical epidemics with malaria is only to be allowed if: (1) a closer description of the type of fever reasonably indicates that this was malaria; (2) the action of quinine was a quick and striking one; (3) the higher susceptibility of foreigners in the endemic regions and the high children's mortality cannot be ascribed to other causes (unhygienic circumstances of occupation troops, etc.); (4) the occurrence of the fever near swamps and pools cannot be explained otherwise and is not in contradiction with our present knowledge of the epidemiology of malaria; (5) the results of seemingly modern measures are in real accordance with the same. The occurrence of relapses and the non-contagiosity of the fever are of no importance in this respect. The " malarial diseases " of the nineteenth century constitute an even less circumscript class of diseases than the " intermittent fevers " of previous centuries.

W. J. Bais.

MARCHOUX (E.). Le paludisme dans les Dombes et en Camargue. [**Malaria in Les Dombes and in Camargue.**]—*Bull. Acad. Méd.* 1927. Jan. 11. Year 91. 3rd Ser. Vol. 97. No. 2. pp. 67–89. [2 refs.]

The author describes and compares in physiographic, historic, and economic detail two rural tracts, situated about 2⅛ degrees of latitude apart in the basin of the Rhone, both having a history of malaria, and both being prolific in *Anopheles maculipennis* at the present time, though malaria is now endemic in only one of them—having become merely a memory in the other.

The region where malaria is now only a tradition (though its embers may occasionally spark in an isolated case) is Les Dombes in the basin of the Upper Rhone. The author describes a rich alluvial plain liable to periodic flooding by that impetuous river. From early historic times the floods were brought and kept in control in a great system of specially constructed ponds, around which ancient rights had consolidated—rights of pasture, of watering stock, of retting flax, of culture of periodically drained ponds—rights all heritable and marketable. Under the *ancien régime* 99 per cent. of the ponds belonged to the clergy and noblesse and by them were let to miserable, badly-housed farmers, who, when their rents had been exacted, had barely enough to live upon and nothing left for increase and improvements. As for the peasants, ill-fed and scantily clad they went forth to their labour at dawn until after night-fall, when they lay them down with the cattle. What the physical condition of this overworked and underfed peasantry must have been, and what the ravages of malaria, seems to have found first expression in the time of the French Revolution, when several communes of Les Dombes prayed in piteous terms for the abolition of the pestilential ponds : " where the ponds are, there the burials outnumber the births . . . . It is sad not to find one sexagenarian in a parish." What the welter of Anopheles must have been in those old days can be imagined from the statement that even to-day, when the area of pond-water is little more than half what it was, their larvae abound in every pond and the adults are to be seen " par millions " in byres, stables, piggeries, and poultry-sheds. So forlorn was Les Dombes that it was without any properly-made road for exporting its produce. So much for Les Dombes under the *ancien regime* : what the author chiefly emphasizes is a peasantry grievously overworked and underfed, and, among conditions interdictive of any economic improvement, the want of proper roads to markets.

To consider next the changes that occurred in Les Dombes in the course of the 19th century. The author gives some details of the rash orders passed by the National Convention for the immediate drainage of all the ponds. Much drainage was gradually done, so that between the beginning of the century and the year 1870 the area of pond-waters had been reduced by more than half (to 8458 hectares, from 20,000 hectares). Of the greatest importance, both for drainage and for economic progress, was the construction of the railroad from Bourg to Lyons, which ran right through the insalubrious district. Still, however, little effect was seen in the incidence of malaria ; still in many communes the number of deaths exceeded the number of births : in 1837 and 1857 the ravages of malaria were of peculiar severity. No great improvement indeed was observed until after 1863. It was then that malaria began to diminish, and " it was between 1880 and 1890 that intermittent fever finished by disappearing," although several thousands of hectares of pond were still intact and Anopheles still abounded.

Before that time, however, methods of farming and cropping under a new regime had improved immensely and there was also much increase of cattle; moreover there was a main line of railway to carry good harvests and fat stock to large markets. As a result the condition of the peasantry was vastly improved ; they were no longer overworked and underfed and oppressed by care ; their minds were easy and their outlook on life enlarged—and this is a point that the author emphasizes.

The story of Les Dombes, however, is not complete. The extensive obliteration of ponds had not been effected without groans from the owners. For the waters bring forth abundantly the moving thing which hath life, and a hectare of pond brings forth annually 100 to 150 kilogrammes of fish worth 500 to 750 fr. ; moreover the dead and dried life accumulated in the bed of a drained pond is manure of unsurpassed richness when the drained bed is cultivated—and all this profit accrues naturally, without cost and with little care. A pond, in fact, is capital too valuable to be destroyed lightly. In 1901 the argument that in the draining of ponds one of the main sources of the communal wealth was also being drained received serious attention, and in that year laws were passed authorizing the refilling of ponds that had been emptied, provided that all such restored ponds be kept in good order and be periodically (every third year) drained again for a season for temporary return to the plough. Under this law 2,800 hectares of drained pond have been revived. Such is Les Dombes under a new regime freed from malaria: although nearly one-seventh of the formerly insalubrious area is still composed of ponds prolific of *Anopheles maculipennis* the increased opulence of the soil and pastures finds full employment, under easy conditions, for a well-nourished and healthy population. But before discussing the causes by which the deliverance from malaria has been brought about, the author presents for comparison another region, also liable to inundation from the Rhone, where malaria persists.

The region is La Camargue, an alluvial island in the delta of the river at the sea face. The physical features of such an island are familiar to everyone. The area of the island is 75,000 hectares, of which only 16,000 are cultivated, notwithstanding the natural richness of much of the soil. This neglect is not due to lack of labour, but is attributed to absentee-landlordism. Such cultivation as there is, is little varied—rice, barley, and lucerne in alternating succession, and the vine. The pastures, however, are not neglected, and one sees large flocks of sheep—besides cattle and horses in a semi-feral state. Labour is recruited from various parts of southern and western Europe, and the recruit is paid a lump sum (à forfat). The individual labourer therefore has to adapt anything he can get as a lodging and it is nobody's interest to see how he is fed. The agents of the landlords, however, have good houses, gauze-protected. *Anopheles maculipennis*, though not nearly so abundant as in Les Dombes, is not difficult to find in stables, piggeries, etc., and is sometimes seen in human habitations. Medical testimony is not entirely unanimous in respect of malaria and the absentee landlords say that it does not exist. But the author himself examined 6 cases in one day and found *P. vivax* in the blood of 3 of them; and of at least 9 local doctors questioned by him at least 8 testified to the existence of malaria, and one of them had treated a small epidemic of 128 cases in 1922. A good proof of the existence of malaria is the fact that visiting strangers contract the disease. Such is La Camargue—and the points upon which the author lays stress are the miserable lodging and bad food of the labourer and the neglect of agriculture.

In his final summary, contrasting Les Dombes and La Camargue as they are to-day, and bearing in mind the condition of Les Dombes in former times, the author admits that the explanation of the arrest of malarial fever in Les Dombes is not "univocal."

He does not think that it is due to better housing, since although the agricultural labourers in La Camargue are housed anyhow, the habitations in Les Dombes are old and inconvenient and men may still be found sleeping in stables there.

He does not appear to think that mere indiscriminate drainage has been a panacea in this instance, since he insists that the ponds, properly managed, are one of the principal sources of present prosperity.

It is on this change from misery to prosperity that he concentrates his argument. What with fish-ponds easily managed, what with the fertilizing value of the deposit of emptied ponds, what with enriched pasture for stock,—what with all this spontaneous gift of Nature, and with easy access to markets, labour is light. The peasantry is now in easy circumstances and lives well—and "it is to general well-being (bien-être) that the disappearance of paludism in Les Dombes is due," as the result of increased natural resistance to infection.

[If, as must be allowed, bien-être has psychical as well as physical aspects, natural resistance must include in its scope all those influences upon the body that emanate from a hopeful spirit and a mind at peace.

It may therefore be relevant (as a pendant to this interesting account of Les Dombes) to remind the reader that the earliest historical record of malarial fever in England relates to the influence of the mind upon the manifestations of ague. The record occurs in the 12th chapter of the 3rd book of Bede's " Ecclesiastical History of the English Nation." It tells that some time in the year A.D. 642, a certain little boy in the monastery of the Northumbrian Saint Oswald had long been troubled with ague. " He was one day anxiously expecting the hour that his fit was to come on, when one of the brothers, coming to him, said, 'Shall I tell you, child, how you may be cured of this distemper? Rise, go into the Church, and get close to St. Oswald's tomb; stay there quiet, and do not leave it; do not come away, or stir from the place, till the time that your fit is to go off: then I will go in and fetch you away.' The boy did as he was advised, and the disease durst not affect him as he sat by the Saint's tomb; but fled so absolutely that he felt it no more . . . ever after."]

A. Alcock.

MÜLLER (Reiner). Die Sagalla- und die Kabartukrankheit der Keilschriften, *Filaria medinensis* und *Mycetoma pedis.* **[The Sagalla and Kabartu Diseases of the Cuneiform Scripts are Dracunculosis and Mycetoma pedis.]**—*Arch. f. Geschichte d. Med.* 1926. Vol. 18. No. 2. pp. 189–192.

The author maintains that descriptions of diseases on Assyrian tablets 2,600 years old, refer to mycetoma pedis and guineaworm. The earliest indication in the literature of tropical medicine to Madura foot is attributed by von RÖMER to Wouter SCHOUTEN who visited the Malabar coast and in his book " Oost-Indische Voyagie " (1676) mentions " Sankt Thomasbein," but the author thinks that his description may equally well refer to elephantiasis. In 1921–23 Erich EBELING published Cuneiform Texts of Medical Interest. Kabartu disease which is there mentioned 19 times the author considers it to be Mycetoma pedis since all the symptoms fit and none are against this diagnosis. EBELING suggests that Kabartu is the same as Sagalla which is mentioned on other tablets 17 times, but Müller cannot agree. Swellings are named in connexion with Sagalla rarely, in Kabartu very frequently: this affects almost exclusively the foot, that various parts of the body. Sagalla is treated by conjurations to drive something evil from the system: in Kabartu these are not found. Sagalla means literally " the big sinew " and suggests the tendon-like *Filaria medinensis.* Extracts from the description [literally translated from the German] are as follows: " The half of the venom it has taken from the snake . . . it has no mouth . . . it draws near like the morning, not recognized in the flesh . . . it has neither face nor gate, it attacks suddenly knee, leg, ankle . . . may it be dissolved, driven away, bound . . . may it emerge below . . . may the (female) bruiser (Zermalmerin) leave thy body." The author admits the vagueness of some of these characters but thinks they fit the guineaworm. The warriors returning from Egypt might easily have brought this infestation if it did not already exist in the intermediary host in the pools of Assyria.

On the Kabartu tablets 19 sentences begin " If a man is ill with Kabartu disease, then thou must. . . . " there follow various remedies, such as serve for binding up or sprinkling, poultices, frictions, etc.; applications to ulcers and fistulas. A number of these pronouncements are given, from which conclusions may be reached about the disease. Thus one shows it to affect the foot which is discoloured; in another, the heel and swelling of the foot are mentioned; in another Ton or clay is mentioned and the desirability of getting it out of the foot; the author suggests this to be the viscid, oily excretion. In another place the condition is spoken of as black, in allusion perhaps either to gangrene or the black granules.

The author observes that mycetoma is now recognized in most tropical and sub-tropical lands, as well as in southern Europe and America, but in Mesopotamia does not appear to be common. However, it may well have been otherwise 2,600 years ago, for there was another population with other customs and other methods of tillage.

A. G. B.

MacArthur (W.P.). **Some Notes on Old-Time Leprosy: the Case of King Robert the Bruce.**—*Jl. Roy. Army Med. Corps.* 1926. May. Vol. 46. No. 5. pp. 321–330. [Refs. in footnotes.]

As Naaman of old in the fountains of Jordan, so now in the Hippocrene waters of the Muse of History is King Robert Bruce cleansed of his leprosy. Going back to this original source and avoiding all the snares of transcribers, the author discovers three Scottish writers who, having had "ample opportunity for collecting accurate information regarding Robert Bruce from his comrades and others who had lived and served with him" are to be regarded as "historical authorities for this [Bruce's] period," and two contemporary English chronicles, valuable enough in their own sphere, but compiled if not in anti-Scottish prejudice at any rate not from sources of intimate familiarity with the Scottish court. These are the five original documents that provide the evidence upon which the author would, to begin with, consider the truth of the statement that Bruce was a leper. (The author also brings Froissart into his court, not as a contemporary witness, since Froissart did not appear in Scotland until 30 years after Bruce had been inurn'd in his sepulchre; but out of esteem and an obvious sympathy with that time-honoured old Chronicle.)

The three contemporary Scottish authorities in their reference to Bruce's fatal illness make no mention of leprosy: one of them, John Barbour, states that it began in a "founder"; another, Andrew of Wintoun, says that Bruce "lay in lang sickness"; and the third, John of Fordun, does not specify any disease.

The two contemporary English chronicles are the *Chronicon de Lanercost,* attributed to a Franciscan monk of Carlisle, and the *Chronicon* of Walter de Hemingborough, a cleric of Gisborough in Yorkshire. The first of these—the only one that the author seems to think worthy of serious attention—states that Bruce deputed to another leader the command of a particular border-raid (the Weardale campaign that was carried out about two years before his death) because he had become leprous, and that he died a leper.

In weighing this historical evidence the author accepts that of the Scottish chroniclers (whom he assumes to be free from bias), as coming with very little indirection from Bruce's intimates. The English chronicler of Carlisle, however, can be proved to be wrong in one particular, since it has been shown from State Records that Bruce was absent from the Weardale campaign because he was then actively engaged in Ireland in an attempt to stir up there a diversion against England; so that, quite apart from any assumption of anti-Scottish bias, his evidence as a historian is suspect.

The author next brings forward much circumstantial evidence against the assertions of the English chronicler. He points out that within 18 months of his death Bruce carried out a highly successful raid far into Northumberland and Durham—an achievement hardly possible for a man far gone in leprosy ; also that in the year before his death he crowned his four-year-old son David and his six-year-old daughter-in-law with his own hands—an act which, performed by a " leper—spreading infection, as was believed, by his breath and touch—would have been an infamous outrage in the 14th century."

Furthermore he notes [for what it is worth] a statement made by the said son David about a certain younger brother—a statement implying that Bruce must have had a son born to him at a time when leprosy (if existent) would have been too far advanced to allow fertility.

With formidable pertinacity the author continues the circumstantial argument, to show that if Bruce had really been a leper, or had even any blemish on him that could be miscalled leprosy, we should not now have to search the chronicles of wasted time for any knowledge of the matter. For Bruce, for the last 23 years of his not very long life had endured an almost inconceivable torrent of sacerdotal malediction, and all men must have been watching for a sign. Not only had he been excommunicated to the utmost limit for the murder of Comyn, and again for refusing the intermediation of the Pope for a truce with England, but every additional sort of imprecation had been invoked against him for his impious contumacy towards the spiritual head of Christendom. For he had ignored and even refused acceptance of Papal bulls ; he had insulted and even permitted outrage of the papal legate ; and had defied the summons of the exasperated Pope himself. Horrified execrations had been showered on him by the hierocracy. The best words for him in his enemies' wame were " perjurer," " felon," " murderer " ; with what sanctimonious triumph, therefore, would they have noised abroad Heaven's heavy judgment of leprosy upon such a sacrilegious rebel and have filled their mouths with the odious epithet " leper," had he been afflicted with a cutaneous disease of any sort.

It would appear, then, from the argument here briefly outlined, that the statement that Bruce was a leper depends entirely on the word of an individual of what Carlyle calls " that most singular extinct species of two-legged animal," the mediaeval monk ; the unknown voice—*vox et praeterea nihil*—crying out in Cumberland, finding echo in Yorkshire, and afterwards during 600 years being repeated from time to time by Carlyle's goose-goddess, " Mortuus est . . . Robertus de Brus . . . leprosus."

A. A.

CELLI (Angelo). Storia della Malaria nell' Agro Romano. **[The History of Malaria in the Roman Campagna.]**—*Mem. R. Accad. Lincei*, Rome.

A review of this work appears on p. 411.

# AMOEBIASIS AND DYSENTERY

## AMOEBIASIS.

CRAIG (Charles F.). **The Symptomatology of Infection with** *Endameba histolytica* **in Carriers.**—*Jl. Amer. Med. Assoc.* 1927. Jan. 1. Vol. 88. No. 1. pp. 19–21. [6 refs.]

Since it is known that most of the infections with *E. histolytica* result from contact with carriers, their detection and treatment is of great importance. It is certain that a large proportion can be cured; and all will be improved in health by proper treatment. The author therefore urges strongly the desirability of a routine microscopic examination of the faeces [his own work and that of J. H. ST. JOHN induces one to add—and by culture] in all patients presenting the symptoms noted in this paper, which are largely confined to the digestive and nervous systems and elicited only by close questioning and survey of the clinical history of past months or years:—(1) constipation relieved more or less by occasional diarrhoea, (2) distaste for food, anorexia, loss of weight, (3) evanescent pains in right iliac region, (4) a mild degree of anaemia, (5) neurasthenia (protean symptoms), (6) subnormal temperature.

The author deplores the fact that the mental picture of amoebic infection is usually coloured by the symptoms of amoebic dysentery, whereas in fact dysentery is noted in only a minority of cases infected with *E. histolytica.* Many carriers of *E. histolytica* have macroscopic ulcers in the large intestine which have not produced dysenteric symptoms. It may be that there are healthy carriers of this parasite; certainly 50 per cent. of carriers can be shown to be injured physically by the amoeba. It is unfortunate that for most medical men " amoebic dysentery " should have become a synonym of " amoebiasis " or " amoebic infection."

H. M. Hanschell.

CRAIG (Charles F.) & ST. JOHN (J. H.). **The Value of Cultural Methods in Surveys for Parasitic Amebae of Man.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 39–48. [6 refs.]

The results of this survey of 71 individuals, carried out with high technical skill, have an immediate practical importance.

(1) It demonstrates that cultural methods are superior for diagnostic purposes to either sedimentation methods or the direct examination of faeces when only one microscopical preparation is examined.

(2) Cultural methods showed that 39 of the 71 persons harboured one or more species of amoebae. *E. histolytica* in 11; *E. coli* in 21; *E. nana* in 9; and *Iodamoeba williamsi* in 4. In 8 persons *E. histolytica* occurred alone; in 5 *E. nana* alone; in 16 *E. coli* alone; and in 2 *I. williamsi* alone. In 8 more than one species was present.

(3) Locke-serum medium gave a larger percentage of positive results than did any of the other methods employed, and neither coagulated egg nor a solid substratum of any kind is necessary for success in surveys for intestinal amoebae.

(4) Successful results with medium composed of 7 parts normal salt solution and 1 part inactivated human blood serum demonstrate that none of the chemicals in either Locke's or Ringer's solution, with

exception of NaCl, were essential in the media used in the survey and that the continued cultivation of *E. histolytica* for indefinite period is possible in this simple medium, as shown previously by Craig.

H. M. H.

JOHNS (F. M.). **Determination of Relapse in Amebic Infections.**—*Southern Med. Jl.* 1927. Feb. Vol. 20. No. 2. pp. 96–98. [6 refs.]

The author has engaged in an intensive study of treatment of amoebic dysentery and eradication of cysts in carriers. Impressions gained from study of the entire series of cases after following many patients for many months are as follows:—By amoebic infection is meant active reproduction of *E. dysenteriae* within the body, particularly in submucosa of large intestine or in abscess cavities within liver. Treatment of this condition with ipecac. or its derivatives, with stovarsol or yatren, quickly reduces actual numbers of amoebae present; visible lesions in rectum and sigmoid apparently heal; multiple small liver abscesses (so called acute amoebic hepatitis) subside, and the patient becomes clinically well. Experience both as laboratory observer and therapeutist shows that most patients suffer a relapse. In the quiescent period following complete clinical cure it is not possible by any present means to be sure of cure even though amoebae are not found in faeces or rectal scrapings. Clinically relapse may occur by renewed open ulceration in caecum, sigmoid or rectum, or by abscess formation in liver. The greatest number of early relapses were signalized by finding encysted amoebae in an apparently normal stool, with patient complaining of vague right-sided abdominal discomfort. In one patient, who relapsed in sixth month, was found in rectum an ulcer the size of a silver dollar, 10 days after proctoscopy had failed to demonstrate any lesion. It is clear the lesion had progressed in the submucosa and suddenly the surface covering sloughed off. Proctoscopy will often reveal small ulcers attending a slight clinical disturbance, and in scrapings from these the amoebae will be found. The author has never found cysts in the lesions of rectum or in the bloody mucoid material adhering to walls of gut. In 3 cases clinical relapse began as liver abscess. He has been unable to confirm KOFOID's so-called "excretion" of encysted amoebae from amoebic liver abscess by examination of duodenal contents; and does not believe that at the present time amoebiasis should be diagnosed on phantom forms the size of yeast cells obtained by duodenal drainage. Even though there are no symptoms, faeces should be examined for amoebic cysts at monthly intervals, for at least 12 months after apparent cure. Culture methods may develop a means of still earlier detection of infection and relapse.

H. M. H.

TRABAUD. Considérations sur quelques manifestations cliniques peu connues de l'amibiase humaine. [**Some Little-known Manifestations of Amoebiasis.**]—*Rev. Méd. et. Hyg. Trop.* 1926. July–Aug. Vol. 18. No. 4. pp. 97–104. [4 refs.]

In Syria amoebiasis is endemic and widespread. Chronic amoebic infections are as common as acute, and since in most cases of chronic infection diarrhoea is absent or is inconstant, it is in general medical work that the chronic infections are often met with. These chronic amoebic infections give rise to—(1) a typical dysentery manifestation, such as mucous stools, perhaps tinged with blood, in patients admitted to hospital for other ailments, (2) ' colitis '—often with obstinate constipation,; (3) gastro-intestinal dyspepsia ; (4) amoebic septicaemia —manifested as irregular fever, and prostration—sometimes typhoid-like illness, anaemia, enlarged spleen and liver, rose or purpuric spots ; yet another type of amoebicaemia gives rise mainly to pulmonary symptoms ; (5) pseudo-surgical syndrome—amoebic cholecystitis and pseudo-appendicular symptoms—there is a true amoebic appendicitis however ; (6) a symptom complex closely resembling Banti's disease. In this *E. histolytica* is found not only in the stool, but also in the fluid removed by duodenal tube. It is cured by anti-amoebic treatment.

H. M. H.

CHOY (Paul Dong). **Preliminary Report on Latent Amoebiasis of Koreans, and the Result of Yatren Treatment.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 79–95. With 6 charts in text.

Part 1. A careful investigation among 2,335 individuals of the incidence of *E. histolytica* infection among different classes of Koreans not suffering from clinical dysentery. The results are set out in tabular form. Some may be given:—

*E. histolytica* was found in 29 per cent. of students ; 31 per cent. of nurses ; 31 per cent. farmers ; and 39 per cent. factory workers. Among hospital cases, in age group 1 to 10 years, 46 per cent. harboured *E. histolytica* ; 41 years and over, 84 per cent. (27 cases). This last group also showed highest incidence of infection with all kinds of protozoa. (DOBELL and KESSEL have pointed out that ratio of protozoal infection increases with age.)

*Sexes.* Infection in females—34 per cent. ; in males 25 per cent., the difference being probably due to occupational differences. Taking all ages, classes, and both sexes together, 61 per cent. were found infected with some kind of protozoan infection ; 30 per cent. harboured *E. histolytica.*

*Geographical* distribution : *E. histolytica* found in 30 per cent. in North Korea ; in 29·3 per cent. in Central Korea ; in 50 per cent. in South Korea ; but in this last only 12 cases examined.

Part II. *Yatren treatment,* tried in 29 cases, in 15 of which follow-up examinations were made. It proved effective in ridding patients of not only *E. histolytica,* but other amoebae as well. Trichomonas (2 cases) was unaffected by it. Yatren is superior to emetine as a remedy in ' latent ' and chronic cases of *E. histolytica* dysentery. Emetine is better in acute cases ; for yatren is apt to produce profuse diarrhoea and colicky pains.

H. M. H.

REICHENOW (Eduard). Zur Frage des Sitzes von *Entamoeba histolytica* im Darm. [**The Seat of** *E. histolytica* **in the Gut.**]—*Arb. a. d. Reichgsndhtsamt.* 1926. Vol. 57. pp. 136–146. With 2 text figs. [18 refs.]

In this paper the author discusses at length, with many references to the work of a number of other investigators, whether *E. histolytica*

**is chiefly a tissue parasite or, like the other amoebae of man's gut, lives mainly in the lumen of the intestines. [The reader gains the impression that Dr. Reichenow's view is that the evidence at hand supports the second rather than the first alternative.] The main lines of his discussion of the matter are :—**

There are the two forms of *E. histolytica* : (1) A large one, with clearly demarcated ecto- and endo- plasm, the latter granular, slightly vacuolated and often containing erythrocytes or cell remnants, the *histolytica*, or tissue-invading type ; and (2) a small much vacuolated form with indistinct differentiation of ectoplasm, and containing no cell-remnants—the *minuta* type. It is held that *histolytica* type lives and feeds only in the tissues, appears in the gut lumen only to encyst, and there its precystic form is the *minuta* type. There are very many carriers of *E. histolytica* without dysentery : this may suggest that *E. histolytica* is a harmless commensal of the gut lumen rather than an obligatory tissue parasite : but it is claimed that in most of these cases tissue regeneration of lesions caused by the parasite is so rapid that no symptoms result, and in general there ensues mutual adjustment between host and parasite. It is counterclaimed that these carriers do present symptoms of various sorts - e.g., constipation, diarrhoea, neurasthenia ; this claim is weakened by the fact that these symptoms are also laid to the charge of flagellates and amoebae that are unquestionably found only in the gut lumen. (BRUMPT (1925) has described *E. dispar* as usually mistaken for *E. histolytica*, with which it is morphologically identical except that *dispar* develops no large tissue-invading haematophagous forms ; as non-pathogenic in man, living only in gut lumen ; as non-pathogenic for kittens, yet sometimes found, even containing erythrocytes, in the kitten's gut wall !) It is improbable that there are different races of *E. histolytica* with different pathogenicities, for by experiment the same race has produced dysentery in one human subject and infected another without causing any sign of dysentery. This gives no support to the view that *minuta* type is a non-pathogenic race of *E. histolytica*, living only in gut lumen and on bacteria. In the gut of both kitten and man ulceration caused by *E. histolytica* may be so slight as to be undetected by naked eye. In contrast to what occurs in man, *E. histolytica* infection in the kitten is an acute, never a chronic, illness. This is understandable if in the kitten (contrary to what happens in man) *E. histolytica* cannot live in the gut lumen. (The author states that infection of the kitten with vegetative forms per clysma is successful more often than with cysts per os, because in the former the introduced catheter damages the gut mucosa and so favours penetration by the amoebae.) Rectoscopy of cases harbouring *E. histolytica*, and complaining not of dysentery, but of some illness more or less referable to the intestines, has revealed lesions of gut mucosa in practically all ; but a truer rectoscopic investigation would be one of an unselected mass of people infected with *E. histolytica*. Abscess of liver or other organ may occur in persons who have never had dysentery—in these the amoebae must have passed through the gut wall. Such abscesses are, however, very much commoner in dysentery cases and invasion of the gut wall by amoebae does not necessarily produce dysentery.

Coccidium is an undoubted tissue parasite. In man its pathogenicity depends directly on its numbers, for tissue regeneration rectifies too rapidly a small infection for symptoms to ensue. Comparing this with *E. histolytica* (the alleged tissue parasite) in man, Dr. Reichenow describes the case of a healthy man with enormous numbers of *E. histolytica* cysts in the stools—and asks—could such large numbers of amoebae feed on the host's tissues and produce no symptoms ? Again—in dysentery cases he has found a mild dose of Carlsbad salts followed by a marked decrease, lasting for at least one day, of number of amoebae in the stool. *E. histolytica* is thus affected *equally* with the non-tissue-invading amoeba species of man. This is not consistent with the view that *histolytica* is exclusively a tissue parasite. The large (tissue) types of *E. histolytica* are not found in these stools after Carlsbad salts. If a *histolytica* carrier case in whose formed stools only cysts are found be given a purge, *minuta* forms can then be demonstrated, and they can be found in early subacute dysentery as well as in healthy carriers. This is understandable if *E. histolytica* can live in gut lumen, as well as in gut tissue. In a case (with history of former dysentery followed by diarrhoea), in which rectoscopy revealed normal gut mucosa, the author found actively motile *minuta* forms, with well marked pseudopodia. Measurements showed nearly all these active amoebae to be of the same size as the cysts (stained preparations usually show *minuta* forms as in the precystic stage only). If carriers without clinical signs of dysentery have *E. histolytica* in the gut wall, one would expect to find often large-type amoebae in their gut lumen. This does not happen. Again if *E. histolytica* is a tissue parasite, one should find in gut lumen immediate precystic forms only, but, in fact, active forms and those showing nuclear divisions can be found in the gut contents.

Most *minuta* forms in gut contents are free from formed food-material the author, however, has found *minuta* containing bacteria. In culture *E. histolytica* feeds on bacteria which are not its sole food, however, for it can also ingest soluble material; this last forms its chief nutriment in the tissues where only few of the *histolytica* found contain erythrocytes or cell remains. (*Minuta* type can also ingest soluble material.) If *E. histolytica* as well as *E. coli* is a parasite of the gut lumen, why should not the latter also invade the gut wall and become pathogenic ? The answer is that *E. histolytica*, in contrast to the other intestinal amoebae of man, is not restricted for food to the bacteria of the gut lumen, but as it can equally ingest material in solution, it can live in the tissues also.

H. M. H.

LUDLOW (A. I.). **Amebic Liver Abscess.**—*China Med. Jl.* 1926. Dec. Vol. 40. No. 12. pp. 1165–1189. With 14 figs. on 4 plates. [24 refs.]

The subject is very fully discussed, with references to the work of others, and on the basis of the author's own experience of 160 cases in Korea. The climate there is temperate. Amoebic dysentery is not rare among the white population in Korea, yet no case of liver abscess in them has been reported. Both, however, are common in Koreans. Of liver abscess 74 per cent. of cases occurred between ages 21 and 40 years. 11·2 per cent. occurred in Korean females—a much higher percentage than that recorded in other countries. Dr. Ludlow's records warrant stress being laid on use of alcohol as a predisposing cause of amoebic liver abscess. History of previous diarrhoea or dysentery was obtained in 90 per cent. of the patients. In three cases of liver abscess *E. councilmanii* was the only amoeba found in the faeces. Dr. Ludlow suggests the possibility of this amoeba being a cause of liver abscess, and that this may be proved when it shall become possible to distinguish between motile forms of *E. dysenteriae* and *E. councilmanii*, or to induce encystment of the motile form—perhaps in culture from liver pus. The abscess developed as a rule insidiously. Large abscesses were present with nearly normal pulse, temperature, respirations and blood count. Duration of illness (in 60 cases) ranged from 2 to 40 weeks—average 11·5 weeks. The large single abscess of right liver lobe predominated; average amount of pus in the last 60 patients was 1,109 cc. Deep seated pain in region of abscess elicited by sudden finger thrust is an important and practically constant sign. The " follow up" mortality of 117 open operations was 11·1 per cent. and of 43 aspirations 2·3 per cent. Early and energetic treatment of amoebic dysentery with emetine is an efficient prophylactic for amoebic liver abscess. No case had developed in Korean or foreigner thus treated. Small liver abscesses can be cured by medicinal means. Even in such cases it is advisable to hasten recovery by aspiration. *Aspiration is the method of choice.* Open operation is not, however, attended with great mortality and is to be used for "selected" cases. Finally the physician must keep a mental attitude of suspicion as to possibility of liver abscess in localities where amoebic dysentery is prevalent and even in places where it is rarer.

H. M. H.

TRABAUD. Le masque amibiasique. [**The Amoebiasis Mask.**]—*Rev. Méd. et Hyg. Trop.* 1926. Nov.–Dec. Vol. 18. No. 6. pp. 167–168.

A characteristic mask may become apparent when a large number of patients with the same disease are assembled together. Thus the malaria facies is easily noted among a group of chronic malaria patients in countries where malignant malaria is endemic. They present a "coloration speciale" of the skin, especially of the face, and the eyes are sunken, with bluish white sclerotics. A number of patients with chronic amoebic infection, observed all together, show a swarthy tint of face against which show up the white sclerotics in the hollow orbits. This is the amoebic facies seen in severe cases, and especially in cryptic forms of chronic amoebiasis. It is a grey pallor of face with a tawny swarthy tint of eyelids and skin around the orbits. The conjunctivae show anaemia. Once noted it indicates the necessity for careful search, by every method, for amoebae. This amoebic facies results from the circulation in the blood of a large quantity of the products of disintegration of red blood cells, which becomes fixed in the malpighian stratum, there absorbs solar rays and is transformed.

[It is noteworthy that the author has not noticed—at any rate does not mention—the slight icteric tint of skin and sclerae so often present in chronic malignant tertian malaria; perhaps this is included in "coloration speciale."]

H. M. H.

KESSEL (John F.). **The Domestic Pig as a Probable Reservoir Host of the Dysentery Amoeba of Man. (Abstract).**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 77–78. [2 refs.]

CAMERON (1924) has summarized the parasitic diseases of the domestic pig, but few protozoan parasites are recorded. [see this *Bulletin*, vol. 21, p. 901]. It has long been known that Balantidium and Iodamoeba are commonly found in the pig, and also the doubtful species of *Entamoeba*, *polecki* and *suis*. Recently the author examined the faeces of 100 pigs from Peking markets. He found cysts whose morphology corresponded with cysts of *E. coli*, *I. butschlii*, *Endolimax nana*, *Entamoeba dysenteriae* and *Chilomastix mesnili*, and in addition an active Trichomonas and a small form resembling Embadomonas. In 30 per cent. of these pigs he found cysts of amoebae which, unstained and stained, were microscopically indistinguishable from *E. dysenteriae* of man. (Transmission experiments to establish further their identity are being undertaken.) The author suggests that the pig may be a reservoir host of the dysentery amoeba, as well as *Balantidium coli* and *minutum*, of man. And in the Orient the pig lives in close proximity to the human family.

H. M. H.

MILLS (Lloyd). **Ocular Disease occurring in the Course of Nondysenteric Amebiasis.**—*Jl. Amer. Med. Assoc.* 1926. Oct. 9. Vol. 87. No. 15. pp. 1176–1182. [23 refs.]

(1). A large proportion of chronic cyclitis, episcleritis, primary and secondary glaucoma, choroiditis and conjunctivitis, unyielding to local treatment, are found associated with heavy intestinal infections of protozoa and flagellates of proved tissue-invasive capacity and nearly always with an accompanying chronic colitis.

(2). The sole addition of effective antiamoebic treatment to the local therapy has procured relief, arrest, or cure of the ocular condition—suggesting a direct or mediate relation between the ocular disease and the effects of the intestinal parasitism.

(3). The symptomatic relief which follows emetine therapy in some cases of " amebic iritis " is enough to suggest its application to iritis of other origin.

(4). The related periodicity of abdominal discomfort, with the exacerbations of chronic ocular disease, especially in iridocyclitis and secondary and primary glaucoma, suggests a hitherto unrecognized intestinal origin in many of these latter cases.

Of 88 patients studied, 16 (18 per cent.) had lost one eye on account of glaucoma. All 88 showed gross abdominal pathological changes with heavy infections of *E. dysenteriae*, with or without flagellates.

(5). Conjunctivitis, corneal ulcers, episcleritis and possibly some forms of keratitis more often occur in association with mixed infections in which Chilomastix, Trichomonas, Craigia and Giardia predominate.

(6). The insidious exudation accompanying " quiet iritis " of protozoan association develops into a dense tough membrane like the Jacksonian membrane about the caecum and colon believed by many to arise from protozoan activity. Formation of this membrane is often arrested by antiamoebic treatment, which should always be a preliminary to attempted iridectomy in these cases.

(7). In horses with " periodic ophthalmia " (a specific recurrent iritis in which no bacterial causation has been proved) protozoa have been found in their faeces.

H. M. H.

YOUNG (W. A.). **An Interesting Case of Amoebic Dysentery and a Suggestion for Treatment.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 370–372. [4 refs.]

Daily microscopic examinations of stools of an amoebic dysentery case, both before and after emetine therapy, revealed a certain periodic decrease and increase of amoebae. The author suggests that the administration of more than one grain of emetine daily for 6 days has an inhibitive effect on production of the tissue-emetine-substance (T.E.S.) which kills *E. histolytica.* Better results would accrue by giving emetine every 3 or 4 days after the first 6 grains—or, if microscope be available, better still by giving 1 gr. emetine 12 hours before multiplication of amoebae is due.

(1). Emetine is a very potent protoplasmic poison—its continued administration so damages cells of gut wall, or of body generally, that T.E.S. is not developed and amoebae are able to reproduce in spite of emetine.

(2). Certain amoebae may be in such sites that T.E.S. does not reach them. But when they reproduce, more tissue is utilized as food and thus their safe retreat should be broken up.

(3). If some amoebae can ward off effect of T.E.S. and survive, a race immune to emetine would be developed. [DOBELL and LAIDLAW experimenting with emetine on *histolytica* cultures, in vitro, could produce no emetine resistant strain of the amoeba.]

(4). YORKE and ADAMS (1925) have shown that amoebic cysts can be made to excyst easily in culture. It is possible, therefore, that the superficial amoebae on first contact with T.E.S. encyst; they later excyst and if at time of excystation no T.E.S. was being produced, reinfect gut wall. Since YORKE and ADAMS have shown that excystation requires neither gastric nor pancreatic juice, such an event in the large intestine does not seem impossible. Though DOBELL and O'CONNOR have denied such a possibility SELLARDS and THEILER, [and HOARE], infected kittens intrarectally by injection of *E. histolytica* cysts. No. 1 above, seems the most probable happening and would explain the clinical findings in the case observed. Therefore, administer emetine until the acute symptoms cease or blood disappears from stool and find out periodicity of the amoebae and administer emetine twelve hours before the new crop is due.

H. M. H.

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BABLET (J.), MESNARD & STÉFANI. Note sur un cas d'abcès amibien du poumon gauche. [**A Case of Amoebic Abscess of Left Lung.**]—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 884–887.

The authors note that amoebic abscess of lung, hitherto considered a rarity, has latterly been more often recorded, most cases being at the base of the right lung and complicating hepatic abscess.

The case here described shows that amoebic abscess of the liver may migrate to the base of the left lung and there continue its development independently after cicatrization of the hepatic lesion. A soldier 35 years old, in Hanoi, suspected of, and treated for one year for tuberculosis, was found with remittent fever, tachycardia, and dyspnoea. Acute tenderness in left hypochondrium, splenic dullness not increased, liver enlarged and tender. Auscultation gave no definite signs of lung lesion. In the blood-stained sputa, Koch's bacillus was never found, nor were amoebae, spirochaetes, nor paragonimus. *Necropsy* revealed an abscess in the left lower lobe of lung. No solution of continuity of left diaphragm which was much thickened. The left lobe of the liver was strongly adherent to diaphragm. No adhesions of colon or spleen. The liver was enlarged and congested. Histological examination revealed a focus of cicatrization in the left lobe of the liver, probably from a former abscess. In the thick pus of the lung abscess were many motile haematophagous amoebae. [The condition of the lower bowel is not mentioned].

**H. M. H.**

TOMB (J. W.). **Thrombosis of the Spermatic Veins following Amoebic Dysentery.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 288–289. [3 refs.]

European male, aet. 33 years, 5 years resident in India ; "clear" history of freedom from venereal disease ; suffered from amoebic dysentery ; emetine injections and emetine-bismuth-iodide by mouth ; apparent cure about 26 days after onset of dysentery. Pain in right testicle and nausea. Spermatic cord, epididymis, and testis swollen and tender. On the cord close to external abdominal ring was a small exquisitely painful nodule, evidently caused by thrombosis of a vein of pampiniform plexus. Pain was severe enough to prevent walking. After one year, dysentery relapse (emetine injections and E.B.I.). Two weeks after acute symptoms of dysentery had disappeared, right testis and cord again became swollen and painful, examination revealing nodule and thrombosis of spermatic vein as before. During next 6 months several dysentery relapses, treated with numerous hypodermic injections of emetine. Right testis and cord throughout this period remained swollen and painful, and varicosity of right spermatic veins now appeared. Patient then invalided to England. During ensuing 6 months no dysentery, and testicular pain became less, but testis remained swollen and marked varicocele developed. He married, and though pain and swelling of testis and cord did not wholly disappear for over 18 months, during which time he had several mild relapses of dysentery (treated each time by injections of a few grains of emetine), the varicosity of spermatic veins cleared up within 6 months of marriage. The condition appeared to be permanently cured.

H. M. H.

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PAOLINI (Renato). Antica atipica amebiasi intestinale nostrale complicata ad ascesso polmonare, ascesso subfrenico e ad empiema sinistro. [**An Atypical Indigenous Case of Intestinal Amoebiasis of Long Standing, complicated by Pulmonary and Subphrenic Abscesses and Left-side Empyema.**]—*Giorn. di Clin. Med.* Parma. 1926. Oct. 10. Vol. 7. No. 14. pp. 537–558.

The author presents a detailed report of an interesting case, followed by a clear and reasoned discussion of the various aspects of the subject.

The patient was a lad of 15 years with a history of acute rheumatism and chorea and with signs of aortic endocarditis. He had suffered for the last five years from crises of abdominal pain and diarrhoea, 3–4 stools daily, liquid and yellow in colour. An exacerbation of symptoms brought him to hospital. No amoebae were found in the faeces on his admission. Soon after, there developed a troublesome cough and an abscess burst into the lung. In the sputum *E. histolytica* was found and further examination of the faeces showed them to be present there also. Emetine was therefore administered.

Further access of fever and abdominal pain ensued and a left-sided subphrenic abscess formed which was treated surgically and in the pus from this amoebae were also seen. This was followed by a left-sided empyema which necessitated a second operation, and in the pus from this also the amoebae were discovered. Thereafter the patient passed an uneventful convalescence and left the hospital cured, 5 months after admisssion.

In the latter part of the paper the various complications, the symptoms, pathology and diagnosis are discussed in greater detail with frequent references to the literature.

H. Harold Scott.

TOMASELLI (Andrea). Su due casi importanti di amebiasi epatica. **[Two Important Cases of Amoebic Hepatitis.]**—*Riforma Med.* 1927. Jan. 3. Vol. 43. No. 1. pp. 3–4. [1 ref.]

A man of 35 years suffered from intermittent attacks of diarrhoea from 1916 to 1922, when they became more severe and were accompanied by passage of blood and mucus. Recently there had been pain in the abdomen, with fever and sweating. The liver was found to be enlarged ; Wassermann reaction was strongly positive ; his serum agglutinated *M. melitensis* up to 1 : 200 ; no amoebae seen in the stools.

Treatment for syphilis and on general lines for undulant fever gave no relief. Emetine in doses of 8 cgm. daily led to the disappearance of the fever in three days and subsidence of the hepatic enlargement and the pain. The emetine was continued, with alternate weeks of rest, for six weeks. With the clearing up of the liver-symptoms the agglutination of *M. melitensis* also disappeared. The diagnosis rests upon the effect of treatment with emetine.

The second patient was a man of 57 years, who had never suffered from diarrhoea, but had had fever for a week with shivering. The liver was enlarged, the spleen just palpable, the serum agglutinated *M. melitensis* in a dilution of 1 : 100 ; the faeces contained *E. histolytica* in both vegetative and cystic stages. Injections of emetine (8 cgm. for a dose) and stovarsol (2 tablets daily) banished the fever in two days. This patient was still under observation at the time of the report.

The chief point is the fact of the serum in each case agglutinating the organism of undulant fever, while the temperature was elevated, although not in high dilution, but sufficient to mislead if the possibility is not borne in mind.

H. Harold Scott.

PANAYOTATOU (Angélique). Abcès amibien du foie chez une fillette de cinq ans guéri par le traitement médical. **[Amoebic Liver Abscess in a Child aged Five cured without Operation.]**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. Nov. 11. Year 42. 3rd Ser. Vol. 50. No. 33. pp. 1548–1551.

The author refers to two cases of " liver abscess," reported by others, in which cure without operation had been effected by emetine injections alone. [No exploratory puncture had been done ; therefore, no matter how pronounced the clinical symptoms, they were not confirmed cases of abscess.]

The case, here recorded, was that of a female child 5 years old. Two months previously she had suffered from dysentery. On examination the child was gravely ill, the liver was very tender and enlarged 5 fingers' breadth below costal margin, and the temperature febrile. Operation was refused. *Exploratory puncture* withdrew 1½ cc. of pus, in which the microscope revealed scanty cysts of amoebae. No amoebae or cysts were found in the stools. Emetine injections and stovarsol by mouth were rapidly followed by disappearance of fever and return of liver to normal dimensions.

The author claims from this case : (1) Clinical signs of liver abscess, confirmed by exploratory puncture. (2) The thinner body wall makes exploratory puncture easy in the child. (3) Confirmation of the possibility of curing even a suppurating amoebic hepatitis of considerable dimensions by emetine therapy alone. (4) It is obligatory to try emetine therapy even in those desperate cases where operation appears to be inevitable.

[The presence of amoebic *cysts* in liver abscess pus, though reported often, still awaits reliable confirmation : puncture for drainage by aspiration costs the patient no more than puncture for exploration only.]

H. M. H.

HAYES (S. N.). **The Treatment of Hepatic Abscesses of Amoebic Origin.**—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 1. pp. 13–14. With 1 text fig. [4 refs.]

A paper with twofold object—(1) To show that liver abscesses can be cured by emetine alone. (2) To suggest definite rules for their treatment.

It ought to be possible to divide liver abscesses into classes, each of which would receive its own particular form of treatment. Cogent considerations are—that (*a*) 75 per cent. of liver abscesses are sterile. [Presumably this means free from bacteria only. Is not the amoeba in the liver a pyogenic organism ?] (*b*) Of the remainder many contain organisms of very low virulence. (*c*) Emetine is a specific for *E. histolytica*. (*d*) Abscesses may be single or multiple ; the latter, the author believes, far commoner than one imagines.

Apposite cases from the author's own experience are described—they are claimed as typical of many, and to justify the dictum that when the amoebae are destroyed the pus will rapidly be absorbed.

*Open operation*—no open wound can be kept sterile. To open a sterile abscess knowing that the cavity will become infected is a procedure incompatible with present day knowledge.

*Siphon drainage*—may be used for infected abscesses and those in which aspiration has failed to evacuate the pus.

*Aspiration*—is surgically ideal : it empties the abscess while emetine kills the causative organism. But for multiple abscesses it is useless, as is any form of operation. In many cases pus will not flow through the cannula. The large abscesses of the past are rare—the commoner form to-day is the small abscess with 5 oz. or so of pus.

It is actually the author's own experience that a liver enlarged two finger-breadths below the costal margin can be reduced by emetine alone. Measurement by fingers serves as a rough guide for treatment. There will be many border line cases—but the tendency will be, with growing experience, to use aspiration less and less.

*The rule*—(1) With liver enlarged up to two finger-breadths below costal margin—treat by emetine injections alone. (Two courses grs. 1 daily for 8 days ; with interval of 1 week between. After the first course the patient is usually well enough to attend as out-patient.). (2) With greater liver enlargement, or a definite fluctuating swelling, or resisting emetine alone—treat by emetine plus aspiration. (3) In cases not responding to above—treat by emetine plus siphon drainage. All patients should follow this up by a course of emetine bismuth iodide gr. 3 daily for 12 days.

[It is plain that under (1) will be included cases that are only hepatitis and not hepatic abscess—no doubt a purely academic point *if* the patient makes *complete* recovery : but it still remains that hepatic abscess is known only by demonstrating hepatic pus : if the needle must be used to demonstrate pus, evacuation of pus through the needle cannot be denied to the patient's welfare.]

H. M. H.

QUÉMÉNER (E.). Contribution à l'étude du traitement des dysenteries amibiennes. **[The Treatment of Amoebic Dysentery.]**—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 672–674.

Describes briefly, as typical of many cases he had observed, three cases of amoebic dysentery in which apparent cure of first attack by emetine injections (6 to 8 of 0·08 gm. each) was followed by two further relapses after 2 to 3 months, each relapse apparently cured by emetine injections, but requiring smaller dosage and fewer injections to procure this relief than in the primary attack. He likens this chronicity and relapse to what occurs in syphilis and pleads that as in syphilis, so in amoebiasis, apparent cure of first attack should be followed at regular intervals by further courses of specific treatment.

Dr. Marcel LEGER discussing Quéméner's paper advocates far more thorough emetine treatment of the primary attack, followed up by stovarsol by mouth, and finally another course of emetine injections. He is certain that many cases of amoebiasis become chronic because the initial treatment has been insufficient. [If the appeal is to syphilis, then the quality and extent of treatment of the primary attack is the arbiter of the subsequent history of the case.]

H. M. H.

VAN STEENIS (P. B.). **On the Treatment of Amoebic Dysentery.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 63–75. With 1 folding chart. [7 refs.]

Against the *histolytica* forms of *E. tetragena* both emetine and yatren gave good results; both failed in some cases. Stovarsol gave less good results against *histolytica* forms, and in one case it may have caused the icterus which developed during its administration. Against *minuta* forms and *cysts* of *E. tetragena* yatren and stovarsol gave good results. The author holds that emetine hydrochloride injected subcutaneously or intramuscularly is still indispensable for amoebic dysentery therapy. It prevents formation of metastatic amoebic abscess. Its disadvantage is its cumulative toxic action which prevents prolonged or oft repeated dosage. Yatren, without cumulative toxic action, is therefore very valuable in so-called " emetine fast " cases. It is especially efficacious against *minuta* forms and cysts. Yatren diarrhoea however, sometimes compels cessation of treatment. No toxic symptoms were noted from the use of stovarsol. [Stovarsol may produce severe arsenical dermatitis, as happens with the various salvarsan and neo-salvarsan compounds; these last also produce icterus and even fatal yellow atrophy of liver, and one of the author's stovarsol treated cases developed icterus.]

H. M. H.

VAN NITSEN (R.). Essais de traitement de la dysenterie amibienne par le nitsol. (Note préliminaire.) **[Treatment of Amoebic Dysentery by Nitsol.]**—*Rev. Méd. et Hyg. Trop.* 1926. Nov.–Dec. Vol. 18. No. 6. pp. 171–174.

In this preliminary note the author gives brief descriptions of 12 cases of dysentery in African natives with *E. histolytica* in stools. Intravenous injections of nitsol (Poulenc) were followed by relief of symptoms and disappearance of amoebae from the stools. The dose varied from 5 to 15 cc. of nitsol given daily or every two or three days. The total amounts required before disappearance of amoebae from stools were 6 cc. (5 cases), 10 cc. (2 cases), 15 cc. (1 case), 20 cc. (2 cases), 25 cc. (1 case) and 27 cc.( 1 case). Nitsol was well borne ; no ill after effects, local or general, were observed. It appeared to have selective action on the dysentery amoebae only. It had no effect on ankylostomes, bilharzia, strongyloides, trichocephalus, trichomonas, balantidium and lamblia.

H. M. H.

i. URCHS (O.). Zur Behandlung des tropischen Dickdarmkatarrhs. [**Treatment of Tropical Colitis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Dec. Vol. 30. No. 12. pp. 715–719.

ii. ——. Technische Bemerkungen zum Rivanolklysma. [**Technique of Rivanol Administration per Rectum.**]—*Ibid.* 1927. Mar. Vol. 31. No. 3. p. 141.

i. For the treatment of amoebic dysentery, the most important cause of chronic colitis in the tropics, the physician has at his disposal two remedies—Yatren 105 and emetine. A third worthy to rank with these two in the treatment of ulcerative haemorrhagic colitis (of varying aetiology) is Rivanol.

He gives brief accounts of 7 cases, including negroes, mixed European-Negro descent, and one Chinaman, occurring in Surinam. All presented a more or less pronounced dysentery syndrome. In one case with *E. histolytica* in stools—emetine injections brought no relief of symptoms. Rivanol solution 500 cc. per rectum daily was followed by rapid disappearance of symptoms and amoebae from the stools.

In one case no amoebae were found in stools ; emetine had no effect. Rivanol solution per rectum procured rapid apparent cure of the dysentery. In three cases of dysentery, *E. histolytica* in stools, rivanol solution per rectum procured rapid relief of symptoms and disappearance of amoebae from the stools. (No emetine had been given). In two cases the bloody mucous stools revealed no amoebae or cysts but many *Schistosoma mansoni* ova. In both cases rivanol solution per rectum and antimosan intravenously was rapidly followed by relief of symptoms and disappearance of *mansoni* ova from the stools.

ii. In order to receive rivanol treatment, ambulatory patients must be put to bed for at least half a day. Tenesmus is controlled by tinct. opii ; it will disappear after one or two rivanol injections. A preliminary cleansing non-irritating enema is given. Rivanol is dissolved in *distilled* water 1/2,000 ; and 500–800 cc. of the solution at body temperature is given per rectum, the patient lying on back or side ; and if ulceration of caecum or ascending colon be present, then in knee-elbow position. The injection must be retained as long as possible, and at least for 15 minutes.

H. M. H.

DOBELL (Clifford) & LAIDLAW (P. P.). **On the Cultivation of** *Entamoeba histolytica* **and some other Entozoic Amoebae.**—*Parasitology.* 1926. Sept. Vol. 18. No. 3. pp. 283–318. [25 refs.]

In a summary of their work the authors state that they have successfully used the method of BOECK and DRBOHLAV for cultivating various entozoic amoebae of man and monkeys besides *E. histolytica.* These amoebae and their sources and their several designations (with the probable and possible synonyms in each case) are set forth in the preliminary pages. Various modifications of the B. & D. technique have been tried, with the objects (1) of obtaining richer cultures, (2) of obtaining individual cultures in which amoebae would live and multiply for a longer term than 2 or 3 days, and (3) of securing under cultivation the complete life history of the amoebae, to the final formation of cysts. The composition and preparation and control of these modified media are described and discussed in thirteen-and-a-half critical pages; it would be no useful service to attempt the impossible task of summarizing them; it must be enough to say that the desired objects—including encystation and excystation of *E. histolytica* were attained by adding solid rice-starch (a material highly unfavourable to Blastocystis) to the culture-medium—under critical conditions The very precautionary methods by which the authors have succeeded. in initiating cultures from cysts are described and discussed; as well as the isolation of pure cultures of a particular species. A discussion is opened out, but not yet completed, on the influence of the concomitant bacterial flora. A concluding section describes experiments showing effects of cultivation on the infectivity of *E. histolytica*; its penultimate paragraphs state that the observations described show "that ability to ingest red blood-corpuscles is in no way correlated with ability to infect and produce dysentery in kittens," and "that cultivation of *E. histolytica* in starch-containing media leads—at least in some strains—to complete loss of infectivity, virulence, and pathogenicity for kittens, though such cultivation does not in any way cause the amoebae to lose their taste for human red blood-corpuscles even after a prolonged period (at least 17 months)."

A. Alcock.

CRAIG (Charles F.). **Observations upon the Cultivation of** *Endamoeba histolytica.*—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 461–464. [1 ref.]

The author had previously described the cultivation of *E. histolytica* for long and continuous periods of time in medium consisting of 7 parts Locke's solution and 1 part inactivated human, horse, or rabbit blood serum. Cultures in this medium proved pathogenic for the kitten. He now describes a still more simple medium, equally successful for the culture of *E. histolytica.* This species can be cultivated apparently indefinitely in mixtures of (1) a modified Ringer's solution and human blood serum, and (2) normal salt solution and human blood serum.

(1) Modified Ringer's solution :—

| | |
|---|---|
| NaCl ... ... ... ... | 8.00 grammes. |
| $CaCl_2$ ... ... ... ... | 0.20 gramme. |
| KCl ... ... ... ... | 0.20 gramme. |
| Distilled water ... ... ... | 1,000 cc. |

Filter, sterilize, and to each 7 parts add 1 part human blood serum inactivated at 56° C. for 30 minutes. Filter mixture through Mandler filter and keep in incubator at 37° C. to determine sterility. Keep in incubator at 37° C. until inoculated.

By daily transfers *E. histolytica* can be maintained easily in this medium.

(2) To 7 parts of normal salt solution (0.85) which has been autoclaved, add 1 part inactivated (56° C. for 30 minutes) human blood serum. Filter through Mandler and keep in incubator at 37° C. to determine sterility—if sterile keep in incubator at 37° C. until used. To inoculate, a small

lump of faeces is mixed with medium and examined at end of 24 hours, the inoculated tube being kept in incubator at 37° C. If culture shows *E. histolytica* it can be maintained easily in this medium by daily transfers. Both these media (1 and 2) markedly inhibit the growth of bacteria.

It is evident that coagulated egg or blood, a solid substratum and none of the constituents of Locke's or Ringer's solutions, except possibly NaCl, are essential for the cultivation of *E. histolytica.* Not even the dextrose of Locke's solution is necessary. The amoeba grew well in a mixture of inactivated human blood serum and Locke's solution sans dextrose. [The greater certainty of diagnosis by culture obviously makes any simplification of culture medium and technique of real practical importance and benefit to patient and physician.]

H. M. H.

VOGEL (H.). Ueber Kulturen der Ruhramöbe und deren Beeinflussung durch Yatren. **[Cultivation of the Amoeba of Dysentery: the Influence of Yatren.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Feb. Vol. 31. No. 2. pp. 74–88. [20 refs.]

The author describes BOECK and DRBOHLAV's method of cultivating *Entamoeba histolytica* and later modifications of the culture medium. He describes briefly the cases from which his strains of *E. histolytica* were obtained and in full detail his methods of culture, the morphology, behaviour and virulence of the cultivated amoebae and finally the action in vitro of yatren on the amoebae in culture. Dysentery amoebae were cultivated from 6 human cases of dysentery, one human amoeba carrier and from the gut of an ape which had died from a dysentery syndrome. The best culture medium was found to be solid agar, covered with a layer of egg white solution to which is added powdered blood agar. Cyst formation was observed in three strains. One strain (from a human case of acute dysentery) in the course of cultivation lost its infectivity for man and kittens. Yatren was found to have a direct lethal action on *E. histolytica* in vitro. A solution of 1/100 killed the amoebae in a few hours; solutions of 1/1,000 and 1/5,000 inhibited multiplication and the cultures gradually died out. *E. histolytica* proved resistant to solutions 1/10,000 through 10 subcultures. After being kept 15 hours in 1/1,000 yatren solution, the amoebae when transferred to yatren free medium regained the ability to multiply; if this period were longer than 15 hours inhibition of multiplication was irreparable.

H. M. H.

YOKOCHI (Kiichi). **[An Investigation on the Habituation of Amoeba.]**—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1926. May. Vol. 33. No. 3. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. p. 354.]

The author found that amoeba could not live in distilled water, urine, bile, milk plasma, and milk serum. It could live in hydrochloric acid, table salt, carbolic acid, corrosive sublimate, up to a certain concentration of these substances.

[Species of amoeba and limit of concentration of any of the substances tested are not stated, but in view of reported findings of *E. histolytica* in gall and urinary bladder it is perhaps interesting to note that urine and bile had lethal effect on an amoeba.]

H. M. H.

FUNKE (John). **The Use of Yatren in Amebic Dysentery.**—*Therap. Gaz.* 1926. Sept. 15. 3rd Ser. Vol. 42. No. 9. pp. 621–622.

A guarded approval of yatren—" In all probability it will in a large measure replace ipecac., and . . . is considerably superior to stovarsol." A sketchy account is given of yatren therapy in amoebic dysentery.

H. M. H.

## BACILLARY DYSENTERY.

WORMS (G.), LESBRE (Ph.) & SOURDILLE (Gabriel). Specificité des infections oculo-articulaires tardives dans les dysenteries bacillaires. [**Specificity of Late Oculo-Articular Symptoms in Bacillary Dysentery.**]—*C.R. Soc. Biol.* 1926. Oct. 29. Vol. 95. No. 30. pp. 1042–1043.

In the course of an epidemic of dysentery, due first to Shiga and then to Hiss bacilli, successively, out of 9 patients 7 showed, besides joint complications a mild scleroconjunctivitis. In all the serum agglutinated Hiss bacillus only in dilutions of 1/200–1/600. One other case showed iritis and corneal ulcers ; the serum agglutinated Shiga and Hiss in 1/50 dilution ; the case gave a strong intradermal reaction with Shiga toxin. He was treated with dysentery anatoxin, which the author prefers to serum. In four cases with severe arthritis the joint fluid showed, besides intense polymorphonuclear leucocytosis, gram-negative cocco-bacilli. Subculture failed. The author was able to demonstrate anti-dysentery bacteriophage in the fluid. The joint fluid agglutinated Hiss bacillus in dilutions varying from 1/100 to 1/400. The tears of the ocular cases proved to be sterile—nor did they contain specific agglutinins. From the stools of these cases were isolated pseudo-dysentery bacilli, non-agglutinable. Culture of urine revealed none of the coli-dysentery group.

H. M. H.

SPRANGER (H.). Der Nachweis von Ruhrbazillen im Blut. [**Demonstration of Dysentery Bacilli in Blood.**]—*Muench. Med. Woch.* 1926. Nov. 12. Vol. 73. No. 46. p. 1926. [5 refs.]

The author notes that in the general opinion the bacillus of dysentery is not found outside the alimentary canal. However, GHON and ROMAN (1915) reported finding type *Y* bacillus in blood and urine of 9 cases, in the milk in 2 cases, and in the gall bladder in one case. NOWICKI (1927) reported *Flexner* bacillus once in the urine ; *Shiga* twice, and *Y* type once in the milk. FRÄNKEL (1915) recorded *Y* type once in the blood and once in the urine : UNGERMANN (1918) reported finding dysentery bacillus once in the blood, as did BOSSERT and LEICHTENTRITT (1920). The author records in this paper finding *Y* type by blood culture in bile medium, in two cases of dysentery, and again in the blood, *Shiga* in two cases, *Flexner* in one, and *Y* type in one In some of these cases Widal tests of the blood, and stool cultures, were negative for the dysentery group. It is plain that dysentery bacilli frequently appear in the blood. Bile is an excellent medium for their cultivation—and in view of the difficulty often experienced in culturing them from stools, and the frequent negative Widal reaction in dysentery cases, blood culture in bile is an important additional aid to accurate and early diagnosis.

H. M. H.

SPRANGER (H.). Das Wachstum der Ruhrbazillen in der Galle. **[Cultivation of Dysentery Bacilli in Bile.]**—*Muench. Med. Woch.* 1926. Dec. 31. Vol. 73. No. 53. pp. 2247–2248. [2 refs.]

This investigation of bile as a medium for dysentery bacillus culture shows that ox bile is a favourable medium for the growth of *Flexner* and *Y* types of dysentery bacillus, but rather inhibits the growth of *Shiga-Kruse* bacillus. This inhibition can be fully overcome by the addition of a small amount of blood. He recommends, for the diagnosis of dysentery, blood culture in bile or bouillon.

H. M. H.

i. CLAYTON (F. H. A.). **A Case of "Sonne" Dysentery in England.** *Lancet.* 1927. Feb. 19. p. 391. [8 refs.]

ii. NABARRO (David). **"Sonne" Dysentery in Great Britain.** [Correspondence.]—*Ibid.* Feb. 26. p. 460.

i. Carl SONNE (1914) described, in addition to Shiga and Flexner groups, a third variety, found in mild cases, which differs from them culturally and serologically. This Sonne type has been identified since in France, Norway and Sweden and in Australia. A considerable epidemic due to it occurred in Aberdeen in 1924. [One of the Sonne Aberdeen dysentery cases subsequently developed toxic arthritis.] CHANNON (1925) obtained the Sonne bacillus in England from faeces of a man who had had dysentery in Egypt. The author describes a case of dysentery occurring in Durham, in September, 1926, from whose stools the Sonne bacillus was isolated. The case had a possible contact relation to the Aberdeen epidemic.

ii. Dr. David Nabarro comments on CLAYTON'S paper. He believes that dysentery is much more prevalent amongst the general population than is generally recognized. As result of his investigations during several years he has come to the conclusion that the organisms he isolated from many cases of epidemic and other forms of diarrhoea in London, in 1921, and named *B. coli anaerogenes* are really identical with those isolated by SONNE from some of his cases in Denmark.

H. M. H.

FRASER (A. M.), KINLOCH (J. Parlane) & SMITH (J.). **Sonne Dysentery in Aberdeen.**—*Jl. of Hyg.* 1926. Nov. Vol. 25. No. 4. pp. 453–460. With 2 charts in text.

Routine examinations of enteritis cases in Aberdeen over a period of 30 months, with no epidemic prevalence, have given 6 of amoebic dysentery, 17 of Flexner dysentery, and 33 of Sonne dysentery. Most of the Flexner and Sonne dysenteries were in institutions where the inmates are under strict medical observation. The authors do not take the above figures as necessarily representing the relative proportions of dysenteric affections but they affirm: "So far as the evidence goes, therefore, it may be concluded that the Sonne bacillus is the most frequent cause of dysenteric outbreaks in Aberdeen."

The symptoms of Sonne dysentery are usually those of an irregular subacute diarrhoea with green stools containing mucus. Exceptional cases are more urgent and may show (1) sudden onset, diarrhoea and colic, with blood and mucus in the stools, or (2) sudden onset, epigastric pain, vomiting, diarrhoea, green stools with mucus but no blood, and rapid prostration. The temperature is elevated in greater or less degree according as the affection is of the severe or the milder type.

Colonies of the Sonne bacillus are larger and more opaque than Flexner colonies and often have crenated edges. Lactose is fermented by the primary culture in 3 to 5 days ; subcultures come to ferment this sugar more rapidly. Subcultures ferment glucose, mannite, arabinose, rhamnose, maltose and saccharose but give rise to no change in xylose, dulcite, sorbite and inulin. Primary cultures are not agglutinated after 4 hours at 55° C. Subcultures however become agglutinable and all strains absorb agglutinins.

The .blood from 31 cases taken 7 to 20 days after onset gave agglutination in 17 of these in dilutions ranging from 1–50 to 1–6,400.

W. F. Harvey.

MURAKAMI (Katsuro). Ueber Milch gerinnende Arten von Pseudodysenterie-bazillen. [**Milk-coagulating Pseudodysentery Bacilli.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Feb. 5. Vol. 101. No. 6–7. pp. 377–383. [14 refs.]

KRUSE divided pseudodysentery bacilli into types A to H and his type E was one which by slowly fermenting lactose caused coagulation in milk. Such strains are commonly to be found in sporadic dysentery cases. SONNE characterizes milk coagulating strains of dysentery bacilli as his type 3. These organisms are also described by Japanese authors—OHARA, MITA, ADACHI, NAKAMURA and MURAKAMI. The Ohara strain, by agglutination test, appears to be a distinct type, allied on the one hand to Aoki's type 7 and on the other to Aoki's type 9. Their relationship to Kruse's type E has not been determined. It may be more correct to regard these organisms as atypical *B. coli* with close cultural and serological relationship to the dysentery bacilli.

W. F. H.

NISSLE (A.). Ein neues Anreicherungsverfahren zum Nachweis von Typhus-, Paratyphus- und Ruhrbazillen im Stuhl. [**An Enrichment Process for Typhoid, Paratyphoid and Dysentery Bacilli in Stools.**]—*Muench. Med. Woch.* 1927. Feb. 4. Vol. 74. No. 5. pp. 185–186.

The enrichment medium is intended as supplementary to direct inoculation of Endo medium and the use of malachite green agar. It is prepared as follows :—

(1) Dissolve pot. iodide 1 gm. in 65 cc. sterile ox bile ; (2) add 4 cc. 1 per cent. malachite green and 30 cc. 3 per cent. caffein ; (3) distribute in amounts of 10 cc. in sterile tubes of 16 to 20 mm. diameter ; (4) sow with about ¼ to 1 cc. stool ; (5) incubate 12, but not more than 15 hrs. ; (6) remove the tubes without shaking ; (7) sow 1 to 2 loopfuls of the surface growth on Endo plates of not less than 15 cm. diameter ; (8) examine after overnight incubation and proceed to further tests.

W. F. H.

SCHÖBL (Otto). **Review of Investigations on Bacillary Dysentery.**— *Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 387–394.

1. *Viability in stools. B. dysenteriae* is fairly resistant to drying; it will survive longer in salt water than in tap water; physiological salt solution and bile favour survival and a combination of the two may help to preserve the life of this organism.
2. *Carriers.* Healthy carriers have been demonstrated and the serum of the carrier usually agglutinated his own strain to a less degree than laboratory strains.
3. *Serological grouping of Shiga strains.* By cross agglutination and cross adsorption tests the majority of Philippine strains were shown to belong to a large group. A small group was made up of most of the strains of *B. dysenteriae* Shiga obtained from abroad, while another group was found which belonged to neither the large or small groups.
4. *Constancy of type.* Shiga strains remained constant in character. Flexner strains could be easily transformed to type Y.
5. *Normal agglutinins and* B. dysenteriae. Local strains of Shiga, with few exceptions and these mostly from carriers, were inagglutinable by normal rabbit serum while certain strains from abroad were slightly agglutinable. Local strains of Flexner were all promptly agglutinated. "The slightly agglutinable Shiga strains showed without exception small flakes and loose sediment, while the Flexner agglutination. showed large flakes and firmly packed sediment." [See also *ante,* SCHÖBL & VILLAAMIL, p. 24.]
6. *Production of serum.* One group consisted of horses receiving live cultures intravenously at weekly intervals, commencing with 1/100 of a slant. The other three groups received subcutaneously live culture, extract, and polyvalent treatment respectively. No difference was found in the results of subcutaneous treatment and the agglutination titre of the serum was only about 1 in 300. The intravenous method of treatment produced a high agglutination titre, 1 in 4,000, by the time two whole slants were injected in one dose, but it was apt to produce collapse towards the end of the course with risk of loss of the animal. The method of immunization therefore for practical purposes, which is favoured, is that of subcutaneous injection of living culture.

W. F. H.

SHIGA (K.). **On the Therapeutic Value of Antitoxic and Antiinfectious Dysentery Serum and Therapeutic Unit of Antitoxic Serum.**— *Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 439–444.

The standardization unit adopted is that which can neutralize 10 times the lethal dose of toxin for rabbit or mouse. The efficacy of antibacterial (antiinfectious) as distinct from antitoxic serum is open to doubt. An antitoxic serum is prepared by the injection of bacilli, so that an antitoxic serum is also more or less antibacterial or bactericidal. Which of these properties is of greater value in the treatment of Shiga dysentery?

The two sera used were: (1) Antitoxic containing 160 immune units in 1 cc.; and (2) antibacterial capable of protecting the mouse in a dose of 0.25 cc. or less against 4 times the lethal dose of bacilli. Twenty-nine cases of Shiga dysentery were treated with antitoxic serum, 8 with remarkable effect, 10 with less remarkable effect, and 11 with little or no effect owing to lateness of administration. Three cases treated with the same dose of antibacterial serum were much less benefited. Pharmacological experiments by OSAWA show that small doses of dysentery toxin stimulate Auerbach's plexus, accelerating peristalsis, while larger doses paralyse, and that antitoxic serum in dilution of 100,000 to 1,000,000 is capable of neutralizing this toxic action. The conclusions drawn are: (1) Antitoxic serum is to be preferred to antibacterial in clinical treatment of Shiga dysentery; (2) the proper curative doses can be estimated in the adopted units, while the anti-infectious (bactericidal) titre affords no therapeutic standard: (3) in the treatment of Shiga dysentery it is estimated that 3,000 to 4,000 units are required for mild or early cases, 5,000 to 7,000 for moderate and 7,000 to 10,000 for severe.

W. F. H.

FUTAKI (K.). **The Dysentery Bacilli in Japan and their Classification.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 395–403.

The organisms responsible for epidemics of dysentery in Japan during the past 23 years are the "Komagone bacilli" A and B, first isolated in 1903. Reports from various hospitals in Tokyo show the relative percentage frequency of dysentery organisms as Shiga 2·2, Komagone A 31·2, Komagone B 66·6. The "Komagone" organisms differ from both Shiga bacilli and the original Flexner bacilli in their absorption agglutination reactions. They are non-toxic and ferment mannite. By their fermentation of galactose they are distinguished from the original Flexner strain. For the classification of dysentery bacilli the absorption serum test, supplemented by the results of fermentation of mannite, arabinose, maltose and galactose are recommended.

W. F. H.

MORISHIMA (Kan-Ichiro). **Mutation of** *B. dysenteriae.* **(So-called Flexner Types.)**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 405–422. With 10 figs. [29 refs.]

Dextrin agar plates were used for the production of variants. The mannite fermenting original culture developed as a round slightly opaque whitish colony. By the third day there developed on the edge of the colonies an irregular dense colony with eclipse-like zone, 3 or 4 times the size of the original and relatively transparent colony. One of these opaque colonies, derived from a Y strain (that is to say, a strain not fermenting, or only fermenting maltose and dextrin with difficulty after some 3 weeks) will show acid production in maltose and dextrin broths within 48 hours. Thus the variant had developed Flexner characters. The reverse type of variant, one deprived of its original acid-producing power, was never obtained. Similarly it is possible to obtain two kinds of colonies from the relatively transparent original, but not from the opaque variant. A Flexner type may split into Y and Flexner types and *vice versa.* Simple agglutination tests failed to differentiate between opaque and transparent colonies, but all transparent colonies absorbed agglutinin both for transparent and opaque colonies, while opaque colonies did not do so for transparent colonies. (See also this *Bulletin*, Vol. 23, p. 670.)

The conclusions drawn are: " (1) The Shiga-Kruse group appears to be stable; (2) The subgrouping of the mannite fermenters appears to be of little importance and all the members of this main group should be considered as more or less interchangeable variants."

**W. F. H.**

ONOMURA (Yonekichi). **Experimental Studies on the Pathogenicity of** *Bacillus dysenteriae* **Komagome B (Futaki).**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1925. Vol. 4. pp. 71–101. With 29 charts. [16 refs.]

1. The oral introduction of *B. dysenteriae* merely showed that the bacilli were able to reach at most, and that seldom, the mesenteric glands. Injection *per rectum* gave more positive results as regards entry into the blood circulation: a few organisms were found in a certain proportion of the animals used, not only in the mesenteric glands, but also on occasion in the heart, liver, spleen, gall bladder pancreas, kidney, suprarenal capsules, lung and bone marrow, thus showing that the organism is capable of entering the blood through the walls of the colon.

2. The organisms entering the blood are rapidly killed. Those that escape destruction are eliminated by way of the urine, bile and intestinal walls; otherwise they are destroyed in the organs into which they have found their way.

3. Agglutinins appeared after injection of bacilli *per rectum* but not *per os*, thus indicating, in the opinion of the author, that living organisms can and do enter the blood circulation by way of the intestine, and that these, though killed, give rise to the agglutinins.

4. Bacteriophage was difficult to find in the intestinal contents after intravenous injection of living bacilli but was found after ingestion *per os* and after injection *per rectum*. Numerous experiments are given showing the details of the results which have led to these conclusions.

W. F. H.

HARTOCH (O.), SCHLOSSBERGER (H.) & JOFFE (W.). Zur Biologie der Dysenterieerreger mit besonderer Berücksichtigung der Katalasereaktion. [**Biology of Dysentery Bacilli, with Special Reference to the Catalase Reaction.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1926. Oct. 28. Vol. 106. No. 4. pp. 666–678. [12 refs.]

The authors summarize their work as follows:—

1. Among the different species of dysentery bacteria no relationship can be demonstrated between the action of the several strains towards mannite and maltose on the one hand and their capacity on the other to utilize simple nitrogenous foodstuffs such as ammonia and asparagin.

2. Among the mannite fermenting strains likewise, the so-called colitis bacteria, no correlation exists between the intensity of utilization of ammonia, their action on maltose and their serological reactions.

3. The catalase reaction can be employed only with a certain amount of reserve for the differentiation of dysentery bacilli, for not only

Shiga-Kruse bacilli, but also occasionally bacilli of the colitis group are unable to decompose hydrogen peroxide.

4. The catalase-negative mannite fermenting strains can be distinguished serologically from the catalase-positive colitis strains.

W. F. H.

SARDJITO (M.). **Immunization against Bacillary Dysentery by Means of Bacteria Lysate of Shiga-Kruse Bacilli obtained by Bacteriophagic Action.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 316–332. [12 refs.]

For the vaccine, as originally prepared, a highly virulent Shiga-Kruse strain was used, while the bacteriophage itself had been brought to a high titre of virulence for dysentery bacilli by repeated inoculations on Shiga-Kruse cultures and filtrations.

The actual preparation is described as follows: (1) Use a 24 hr. Shiga-Kruse agar culture; (2) add to a suspension of 300 million bacilli in Martin bouillon of pH 7·5, 2 cc. of bacteriophage; (3) keep overnight at 37° C.; (4) add to the now clear bouillon another 200 million Shiga-Kruse bacilli; (5) incubate 24 hrs. till clear; (6) add still another 200 million bacilli to this clear bouillon and incubate again for 24 hrs.; (7) filter and test for sterility; (8) keep the lysate thus prepared for one month at room temperature before using as vaccine.

The modifications made on the preparation as described were designed to lessen the reaction given by the vaccine. The addition of formalin proved an advantage in this connexion, but the acidity of the formalin had to be neutralized. The results on rabbits, by subcutaneous injection and *per os*, were encouraging and it was shown that the injection of 1 cc. of formalinized vaccine subcutaneously did not cause a serious reaction in man.

W. F. H.

GLOUKHOFF (K. T.), WOLKOWA (E. A.), EROUSSALIMTCHIQUE (G. L.) & PANINE (L. G.). [Vaccinothérapie de la dysenterie bacillaire " per os."] **[Vaccine Treatment by Mouth in Bacillary Dysentery.]**—*La Médecine Prophylactique.* 1926. July–Aug. Nos. 7 & 8. p. 64. [Summarized in *Bull. Inst. Pasteur.* 1926. Oct. 31. Vol. 24. No. 20. pp. 909–910.]

During an epidemic of dysentery at Leningrad in the summer of 1925, 105 patients were given vaccine treatment per os. 81 were closely observed. 19 of them were grave cases—toxic, high fever, frequent stools, vomiting and severe abdominal pains. 20 cases were of medium severity and 42 were mild. Treatment consisted of ingestion of tablets containing 100 million Shiga and Flexner bacilli. The tablets were dissolved in 50 cc. of water and the emulsion taken fasting. Adults received two–three tablets a day to the exclusion of all other medicaments. Some were given, by the mouth, an emulsion of dysentery bacilli with 20–25 per cent. added alcohol 96°, incubated for two days (ZABOLOTNY). The majority of these vaccine treated cases showed in the first 24 hours marked improvement. The earlier from onset of illness the vaccine was given the better the result. Comparison between these vaccine treated cases and the other dysentery cases treated at the same time with serum, in the same hospital, compelled a verdict in favour of the vaccine. Considering only the severe and moderately severe cases—serum treated cases had mortality of 27 per cent. [numbers not stated] ; vaccine per os treated cases had mortality 7·7 per cent. [presumably among 39 cases.].

H. M. H.

GUPTA (C. C. Das). **The Treatment of Bacillary Dysentery by Cresol.**—*Indian Med. Gaz.* 1926. Oct. Vol. 61. No. 10. p. 499.

F. J. PALMER (1924) has reported satisfactory results from cresol (Sanitol) in bacillary dysentery.

Fifty cases of dysentery on a tea estate were being treated by emetine injections without success ; the author suspected the outbreak to be bacillary, and on clinical grounds diagnosed it as such. He gave m.i. of cresol in 1 oz. water per os three times a day for four days. In most cases marked improvement appeared after the 6th dose, and all symptoms subsided with three more doses on the third day. Besides the cresol per os, in the severer cases, 25 cc. antidysentery serum was injected subcutaneously.

The author urges trial and report on cresol by mouth. He believes that it would be indeed a boon should it prove as efficacious in bacillary dysentery as is TOMB'S essential oils mixture in cholera.

H. M. H.

TAKEMATSU (Susumu). [**On a Species of Bacilli isolated from a Case of Dysentery.**]—*Gun-I-Dan Zasshi* (*Jl. Army Med. Corps.*). 1926. Mar. No. 153. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. pp. 358–359.]

The bacillus isolated disappeared from the stools after the 20th day. It was non-toxic to the rabbit and differed from other such species in its action on milk, which was coagulated from the bottom on the 2nd day and gave a thin layer of yellowish transparent whey by the 4th day. Immune rabbit serum of this bacillus showed strong agglutination for the homologous organism and very weak for all dysentery and *B. coli* group organisms.

W. F. H.

## MIXED AND UNCLASSED DYSENTERY.

i. RHODES (W. F.). **Pathology and Laboratory Diagnosis of the Dysenteries.**—*Jl. Med. Assoc. S. Africa.* 1927. Jan. 8. Vol. 1. No. 1. pp. 4–6.

ii. TAYLOR (A. B.). **Medical Side of the Dysentery Group.**—*Ibid.* pp. 6–9.

iii. PEARSON (M. G.). **The Surgical Aspect of the Dysentery Group.**—*Ibid.* pp. 9–10.

iv. KAPLAN (M. W.). **The Paediatric Aspect of the Dysenteries. (Contributions to a Symposium at the Natal Coastal Branch.)**—*Ibid.* pp. 10–13.

i. A concise review of the subject in which it is pointed out that by examination of smear from a *fresh* stool it is possible to diagnose the type of dysentery, from the character of the cellular exudate. [These characters have often been detailed and their importance emphasized in this *Bulletin.*] Cultural methods in acute bacillary dysentery involve a delay of two days before results are given—the two most valuable days for treatment. For the rest the author notes that bacillary dysentery stools are odourless and alkaline to litmus, whereas amoebic dysentery stools are strongly foetid and acid to litmus.

ii. Usually the physician is able to confirm the patient's own diagnosis of " dysentery "—and but for " the differential diagnosis between bacillary and amoebic dysentery and the scientific treatment of either type—dysentery would come under the class of " chemist-treated diseases." This differentiation clinically is practically impossible. If a guess must be hazarded, then bacillary dysentery tends to be of sudden onset, with initial fever and toxaemia ; amoebic of slower onset with less fever and toxaemia and less abdominal pain and tenesmus. The bacillary stool contains as a rule much fresh blood and much gelatinous mucus and gives little odour. A very malodorous bloody stool containing thin mucus is more likely to be amoebic. At autopsy perforation of bowel or intestinal haemorrhage characterize amoebic dysentery, while in bacillary dysentery death results from toxaemia and physical exhaustion and is less sudden therefore than in amoebic cases. The use of emetine for diagnostic purposes is excused for mild cases : it is deprecated for more acute cases, for the delay of two or three days may account for chronicity in the bacillary type. [In both mild and acute bacillary type emetine may account too for death.] Antidysenteric serum and sodium sulphate is advocated for treatment of the bacillary cases and emetine for the amoebic.

iii. Obstruction after dysentery usually is found to be due to malignant disease of the colon. The surgeon may help to diagnose amoebic hepatic abscess but he has little else to do. Aspiration and emetine injections will cure all but a very few abscesses. The open operation is rapidly becoming a thing of the past. " So that when the whole subject is ' boiled down ' the surgery comes to this : that in chronic cases of dysentery which resist other means, appendicostomy may be extremely valuable."

iv. Bacillary dysentery is far commoner in infancy than is generally believed. The first year of life provides the largest number of cases. Amoebic dysentery is extremely rare under the age of two. Over that age it runs the same course as in adults, but amoebic abscess is very rare. Diarrhoea in children is often in fact bacillary dysentery. Differential diagnosis depends on stool examination. A rectal examination will exclude intussusception. Treatment of the bacillary type is mainly dietetic : with sodii sulph. by mouth. In amoebic dysentery in infants a child of two should be given gr. ¼ emetine daily for 12 days.

H. M. H.

KAWATA (Keiji). **On Ekiri, an Epidemic Infantile Diarrhoea.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 723–726.

In several districts of Japan there prevails, mostly in summer, but in spring and autumn also, a very acute disease of infants with sudden onset, fever, muco-diarrhoeic slightly sanguineous stools, cramps of limbs, collapse. Death or recovery may follow within 24 hours of onset. Mortality varies between 39 and 82 per cent. This disease is named ekiri, and the author thinks it is probably the same as the summer diarrhoea of infants in America. Many investigators have found a *pseudo-dysentery bacillus*, which is believed to be the cause of the illness. An adult infected with ekiri shows symptoms of simple dysentery, and dysentery in a family may be passed on to the infant in whom it shows as ekiri. Suckling infants are never affected. In France REMLINGER and DUMAS demonstrated inflammatory swelling of suprarenal glands in dysentery corpses. NIIHO has demonstrated the same in ekiri. Among very many treatments the author has found (since 1918) injection of adrenalin subcutaneously, 0·3 to 0·5 cc. of 1/1,000 solution, as early as possible after onset of illness, to be the only effective remedy. The patient must also be given abundant quantities of liquid—water, lemonade, sugared water—to drink. Adrenalin 8 hours after onset of ekiri is practically useless. In 78 cases this treatment has reduced mortality to 7 per cent. Death in ekiri can be traced to heart failure due to functional insufficiency of the suprarenal glands, which may be made up for (in part) by the adrenalin injections. He pleads for its trial in summer diarrhoea.

H. M. H.

PACHECO (Genesio). Conceito actual das dysenterias e as dysenterias entre nós. [**Present-day Notions of Dysentery; the Disease as found in Brazil.**]—*Sciencia Med.* 1926. Dec. 31. Vol. 4. No. 12. pp. 627–662. With 1 chart in text. [1 ref.]

Faeces were sent for examination to the author's laboratory which was some distance from the hospital, and clinical data were rarely obtainable. 107 specimens were examined and 60 per cent. yielded positive results. In this were included 25 cases of infantile diarrhoea. *E. histolytica* was found in three (2·8 per cent.); dysenteric bacilli were isolated 57 times, namely, that of Russell & Hiss 30 (28 per cent.), Shiga 20 (18·7 per cent.), Flexner 5 (4·6 per cent.) Schmidt 2 (1·8 per cent.); Strong's was not found in any. *B. paratyphosus* B. was isolated on three occasions, twice from adults and once from a child of 9 months.

In Rio de Janeiro, dysentery is eighth on the list of the causes of death, accounting for 316 cases in 1924 and 435 in 1925; in S. Paulo 151 deaths were notified from dysentery in 1925. The populations are not stated.

Appended to the paper is a tabulated list of the cases, giving in few words the naked-eye appearance of the stools and the results of bacterial examination.

H. Harold Scott.

LOPEZ (V. J.). **Gastro-Enteritis in Alipuram Jail, Bellary.**—*Indian Med. Gaz.* 1926. Dec. Vol. 61. No. 12. pp. 590–593.

The Alipuram jail accommodated 4,000 to 6,000 Moplahs. On admission, their health was deplorably bad. Many were old men, and all had suffered hardship, privation and exposure during the Moplah rebellion of 1921. Hookworm infection was cent. per cent. Dysentery was rife. Among them have occurred many cases of "gastro-enteritis," this last term being used for a malignant form of dysentery resembling cholera which did not manifest itself in epidemic form till November 1923. This type is not common in other Indian jails except where Moplahs are interned. In the Alipuram jail Shiga's bacillus was the causative organism in this fulminating type. The Moplah thus appears to harbour Shiga—which must therefore be common in Malabar. CUNNINGHAM and KING'S investigation in jails of Bengal and Eastern Bengal revealed fulminating dysentery to be rare and that bacillary dysentery (79 per cent. Flexner) was much commoner than amoebic.

The sanitary arrangements in Alipuram jail are all that could be desired, fly nuisance practically nil. The Jewell filtered and chlorinated water was highly alkaline and contained excess of soluble sulphates—it may have caused gastro-intestinal trouble. Change of water supply has been followed by no regular epidemics of "gastro-enteritis," although the disease has not disappeared. Meteorological conditions, different (and colder) from those in Malabar, may be a predisposing factor. The possibility of infection of food supply is negligible. Systematic and continual search for "carriers" and latent cases among all the convicts is carefully carried out. This has been in vogue for four years; yet at every fresh examination a few cases of latent dysentery previously undetected are found. The conclusion is that cases of latent dysentery do not always exhibit signs. All convicts and warders who are cooks and food-handlers, and on water duties, are systematically examined and proved not to be carriers of organisms of the dysentery and enteric groups.

Onset of the illness is fairly sudden, beginning with diarrhoea and vomiting. Stools soon become watery with immense amounts of mucus, with or without blood. Fever of varying degrees. Extreme toxaemia and early collapse irrespective of number of stools and vomit. Cramp is not constant. In fatal cases death generally takes place within the first 24 hours of onset. After this critical period improvement though slow is steady.

Lister Institute multivalent antidysenteric serum gave disappointing results, due perhaps to the fact that this is not a primary disease, but an acute exacerbation of a chronic ulceration of bowel with necrosis. Cresol and essential oils tried in a few cases gave ambiguous results. [No mention is made of any attempt to improve individual resistance by lowering the cent. per cent. hookworm infection. The author notes that "the ravages of this disease [hookworm] had evidently caused irremediable impairment of health in some cases."]

H. M. H.

KOOPMANN (Hans) & KRÜGER (Emilie). Ueber die "chronische Ruhr." [**Chronic Dysentery.**]—*Med. Klin.* 1926. Dec. 24. Vol. 22. No. 52 (1150). pp. 1993–1996. [22 refs.]

The authors' investigation leads them to the conclusion that:—

(1) Chronic dysentery (type Y) is very widespread. It is common in tuberculous adolescents. Its infectiousness, though proven, is not of a high degree.

(2) The Widal reaction is reliable for diagnosis of "chronic dysentery."

(3) The gut diverticula, gall bladder, pancreas and appendix are sites specially selected by the dysentery bacilli, in which they remain latent and hidden for long periods.

(4) Chronic dysentery infection is a relatively mild disease, readily amenable to treatment, though occasionally resistant.

(5) Without doubt the best treatment is that of WAHL—oral administration of Yoghurt preparation.

H. M. H.

HURST (Arthur F.). **A Discussion on the Diagnosis and Treatment of Colitis. (The Opening Paper in a Discussion on Colitis at the Medical Section of the Royal Society of Medicine, on Nov. 23rd, 1926.)**—*Lancet.* 1926. Dec. 4. pp. 1151–1154. [14 refs.] Also in *Proc. Roy. Soc. Med.* 1927. Feb. Vol. 20. No. 4. pp. 367–375 (Sect. of Med. pp. 1–9). [Discussion by THURSFIELD (H.), DUDGEON (L. S.), RYLE (J. A.), ABRAHAMS (A.) & others, pp. 375–380 (Sect. of Med. pp. 9–14.)]

" No diagnosis is made more frequently and with less justification " than colitis. The diagnosis should not be made " until a thorough investigation has shown that inflammation of the colon—nothing less and nothing more—is present." In the course of this interesting paper the author makes it clear that such thorough investigation means sigmoidoscopy. If mucous membrane of rectum and pelvic colon is quite healthy, ulcerative colitis can be excluded. If blood and pus be passed by a patient with healthy rectum and pelvic colon, a growth of colon is almost certainly present; if within 12 inches of anus it can be recognized by the sigmoidoscope. The author doubts if any severe colitis exists apart from the specific forms caused by infection with the *Amoeba histolytica* and *B. dysenteriae,* and " *sporadic ulcerative colitis* " ; his own experience makes this last identical with that of *B. dysenteriae,* except that in no case has he, or his bacteriological colleagues, obtained a dysentery bacillus from stools or mucus taken directly per sigmoidoscope, from the ulcers. Nor has any of these patients' blood agglutinated any of the known strains of *B. dysenteriae.* In long standing cases failure of treatment may be due to stricture; and X-ray examination is of value only in this type of case. In other types it provides at best only information readily available by other methods. The autopsy records of the London hospitals for the 25 years ending in 1908 did not contain one example of stricture following ulcerative colitis. However, the author has watched this develop in four cases, and in three other cases polypi develop as the ulceration healed. Polypi tend to become malignant. An intermediate stage of polyposis probably had preceded the actual development of cancer of rectum, following chronic dysentery in two cases, and of the colon in one other. In sporadic ulcerative colitis treatment is on general lines —rest in bed, dieting, and lavage of colon. Since 1919 the author has obtained, on the whole, excellent results from polyvalent anti-dysenteric serum injected intravenously in large doses—40, 60, 80, 100 cc. on successive days and then 100 cc. for a few additional days. Appendicostomy had not given beneficial results.

*Discussion.*—Dr. Hugh THURSFIELD had for several years given antidysenteric serum, at once, to children suffering from severe diarrhoea. In a fair proportion subsequent bacteriological investigation demonstrated some type of dysentery organism. He was sure this practice had saved many infant lives.

Professor L. S. DUDGEON recognized 3 forms of ulcerative colitis due to; (1) *E. histolytica*; (2) Bacillus Shiga and Flexner; (3) one in which no causative organism has been found. These last patients had not been abroad. He had been unable to cultivate a true dysentery bacillus from scrapings of ulcers (per sigmoidoscope) though in some cases such procedure had demonstrated *E. histolytica* which numerous faeces examinations had not revealed. The only microbes he had found, which appeared related to the intestinal ulceration, were haemolytic strains of *Bacillus coli* and *Bacillus mucus* *capsulatus*. Two ulcerative colitis patients, who had never been abroad, showed high serum agglutinin content for B. Shiga, although that bacillus was not isolated from their faeces. He recognized three forms of polypoid growths in colon complicating bacillary dysentery and ulcerative colitis, (1) simple adenomata, (2) the same in conjunction with carcinomata, and (3) infective granulomata which might be partially or completely covered by mucosa.

Dr. J. A. RYLE confirmed Hurst's claims in use of both sigmoidoscope and polyvalent antidysenteric serum in ulcerative colitis. In 3 cases laboratory had failed to find amoebae or cysts, but sigmoidoscopy revealed characteristic amoebic ulcers. Recovery followed on emetine therapy.

Dr. Adolphe ABRAHAMS had observed no benefit at all from antidysenteric serum ; perhaps he had given too small doses.

Dr. Hurst, in reply, welcomed the support for his view that ulcerative colitis was an aberrant form of bacillary dysentery.

H. M. H.

SCHUR (Heinrich). Das Emetinum hydrochloricum in der Behandlung der Colitis ulcerosa. [**Emetine in the Treatment of Ulcerative Colitis.**]—*Wien. Klin. Woch.* 1927. Feb. 10. Vol. 40. No. 6. p. 188.

The author stresses his almost unfailing good results from emetine therapy in ulcerative colitis. These cases, in which dysentery bacilli cannot be isolated, are in fact amoebic, though amoebae may not always be demonstrated. The proof of this is the beneficial results from emetine treatment. He gives emetine in small doses—0·02 gramme three times daily—subcutaneously. In this dosage no toxic or harmful results have been detected. These emetine injections, however, must be combined with daily colonic irrigations, using mild astringents.

H. M. H.

WEISS. Ueber Carbo medicinalis "Merck" bei chronischer Ruhr. [**Carbo Medicinalis in Chronic Dysentery.**]—*Med. Klin.* 1927. Feb. 11. Vol. 23. No. 6 (1157). pp. 216–217.

The unsatisfactory results of the treatment of chronic amoebic or bacillary dysentery are well known to tropical practitioners and ships' surgeons. Relapses are frequent and bring in their train a group of neurasthenic symptoms. The author had under his care a patient with the characteristic syndrome of three-year-long dysentery (amoebic or bacillary). An injection of anti-dysentery serum had produced severe serum disease (anaphylaxis) ; twenty-seven years before this the patient had received an injection of anti-diphtheritic serum ! As many drugs—notably emetine and yatren—had already been tried, the author treated the case with carbo-medicinalis "Merck," with rapid relief of symptoms and recovery of good health. The author urges that this charcoal preparation should form part of the materia medica of stores of all ships in the tropics ; and that it should be given a trial in chronic dysentery cases.

H. M. H.

Doré (G. R.). Enterorrhagies répétées rebelles guéries par une injection unique de novarsénobenzol. **[Intractable Enterorrhagia cured by a Single Injection of Novarsenobenzol.]**—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 903–905.

An Annamese soldier suffered from repeated passages of blood per rectum during many weeks. A great variety of dieting, rectal lavages, intravenous and subcutaneous injections of emetine, intravenous injections of calcium, etc., failed to control the almost daily haemorrhages. The blood and cerebro-spinal fluid were always found to be Wassermann negative; no entozoal or protozoal parasites were ever found in the stools. Blood culture always negative. X-ray revealed perfectly normal intestines. Rectoscopy showed only a small superficial ulcer on right rectal wall. A single injection of novarsenobenzol 0·15 gm. intravenously was followed by disappearance of blood from stool and rapid recovery of weight and well being. A final rectoscopy revealed nothing abnormal.

H. M. H.

O'Connor (F. W.). **The Electrical Sigmoidoscope.**—*Proc. Assam Branch Brit. Med. Assoc. Annual Meeting Silchar, 1st and 2nd March, 1926.* pp. 19–22.

The author urges that the sigmoidoscope is an invaluable instrument in diagnosis, prognosis and treatment. It differentiates between amoebic and bacillary dysenteries. Periodical sigmoidoscopic examination is the only logical method to ensure proper treatment of bacillary and amoebic dysentery. Each produces characteristic lesions of the bowel. These claims are given illustration by descriptions of clinical cases of various types in which its use ensured accurate diagnosis, appropriate treatment, and a reasonably sure ground for ceasing treatment. Though in tea garden practice its use may be comparatively limited, yet it is indispensable for those who would accurately observe and treat bowel complaints in the tropics.

H. M. H.

Arnozan (X.). Un cas de lambliose. Traitement par l'*Hydrargyrum cum creta*. Guérison. **[A Case of Lambliasis treated by Hyd. c. Cret.]**—*Jl. Méd. de Bordeaux.* 1926. Nov. 25. Vol. 103. No. 20. p. 863.

A male infant, 20 months old, developed diarrhoea, which continued in spite of dieting. The child became enfeebled and 3 months later suddenly developed rigor, cyanosis, hyperpyrexia (rectal T. 41·5° C.), respirations 55 per minute, pulse 140, and sank into coma. After 24 hours recovery was almost as sudden. The stools were now found to contain many Lamblia cysts. Diarrhoea continued and 2 months later another but less severe pyrexial attack occurred, with many Lamblia in stools. The child was then given hydrargyrum cum creta, 10 cgm. daily for two days, then 5 cgm. daily for four days. Improvement was rapid and marked. After a month's interval hyd. cum cret. 10 cgm. was repeated daily for four days. Repeated examinations of stools during two months following revealed no Lamblia. The infant recovered perfect health and at 5 years of age was without ailment and the stools were entirely free of Lamblia. In two other cases in adults of diarrhoea with Lamblia in stool, the author had found the Lamblia disappear after treatment with hyd. cum cret.

H. M. H.

DELANOË (P.). Un cas de dysenterie mixte à la fois amibienne et balantidienne contractée par un arabe à Mazagan. **[A Case of Dysentery, both Balantidial and Amoebic, in an Arab at Mazagan.]**—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 83–92. With 3 text figs. [4 refs.]

The much enfeebled and wasted patient presented the clinical signs of dysentery. Careful enquiry failed to elicit any contact with pig or pork. In the muco-sanguineous stools were numerous motile amoebae containing red blood corpuscles and many *Balantidium coli.* Not a few *Blastocystis hominis* were present also. The amoebae definitely disappeared after 4 grammes of stovarsol had been ingested—but neither stovarsol, ipicacuanha (Ravaut's paste), acetylarsan, novarsenobenzol, nor iodine and quinine bowel lavages, appeared to have any effect on the Balantidium. Five intravenous injections of stibyl 0·03 0·045 and 0·06 grammes at intervals of 2 to 3 days caused Balantidium to disappear. The patient died 7 days after leaving hospital. [No necropsy was (apparently) obtained]; the author does not claim that Balantidium had been definitely got rid of. He notes that balantidiasis in human beings, first recorded in North Africa in 1914, has been seldom reported there since.

H. M. H.

SÉGAL (J.). Un cas d'entéro-colite à *Balantidium coli*: traitement par le thymol et le thymol et le stovarsol: guérison. **[Case of Balantidiasis treated successfully by Thymol and Stovarsol.]**—*Rev. Méd. et Hyg. Trop.* 1926. Nov.–Dec. Vol. 18. No. 6. p. 176.

The patient had suffered for two years from muco-membranous and muco-sanguineous diarrhoea, with progressive loss of weight and inability to ingest any solid food. The stools contained numerous *Balantidium coli.* Thymol 3 grammes daily for three days followed by seven days stovarsol, 0·50 grammes daily, procured rapid disappearance of Balantidium from stools and progressive gain in weight and well-being. Three months later patient was quite well and there had been no relapse. [Presumably this occurred in France.]

H. M. H.

BRUG (S. L.). Een geval van Infectie met *Balantidium coli.* **[A Case of *Balantidium coli* Infection.]**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 5. pp. 589–590.

A case of balantidiasis in an Amboinese soldier, in which it was doubtful whether the parasites were responsible for the occasional attacks of diarrhoea. The parasites were absent from normal stools, but appeared in the diarrhœic evacuations after a laxative. There was never any blood in the faeces. A course of santonin (25 mgm. with 50 mgm. calomel twice a day for 3 days) permanently cured the infection. It appears that balantidiasis is not necessarily a serious affection.

W. J. Bais.

SAISAWA (Kozo) & TANABE (Bunshiro). Notes on the Healthy Carriers of Dysentery Bacilli.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 445–455.

SÉGAL (J.). Sur un cas d'hépatite amibienne autochtone.—*Rev. Méd. et Hyg. Trop.* 1926. Nov.–Dec. Vol. 18. No. 6. p. 177.

THOMSON (Margaret Dora). Experimental Amoebiasis in the Rabbit.—*Univ. California Public Zool.* 1926. June 23. Vol. 29. No. 2. pp. 9–23. With 5 text figs. [24 refs.]

## SPRUE.

BAUMGARTNER (E. A.) & SMITH (Glenn D.). **The *Monilia psilosis* as a Cause of Tropical Sprue.**—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 433–441. [17 refs.]

In a series of eleven cases of sprue studied from the bacteriological standpoint, *Monilia psilosis* was found frequently in the faeces of every one. Ulcers from the mouth also gave positive cultures twice in the same patient. In blood cultures a negative result was obtained, but a yeast was obtained in two which did not give the typical sugar reactions of the true *Monilia psilosis.* The cases were derived from China, India, Korea, Porto Rico and the Philippines. These same monilia have been isolated from a few other conditions, and also from the stools of true pernicious anaemia in four out of seventeen cases. The authors feel sure from the evidence before them that the monilia is more than a secondary invader and think that their findings in this series constitute additional evidence of the etiological relationship of this organism to sprue.

P. H. Manson-Bahr.

ELDERS (C.). Spruw en pernicieuse anaemie in verband met deficientie. **[Sprue and Pernicious Anemia in Connexion with Deficiency.]**—*Geneesk Gids.* 1926. Nov. 19. Vol. 4. No. 47. pp. 1109–1112. [8 refs.]

The views of Elders, who considers sprue as a deficiency disease (lack of animal proteins and vitamins in general), have been referred to previously (see this *Bulletin,* Vol. 21, p. 705). From the similarity of sprue and pernicious anaemia he concluded that this disease had the same etiology. He now draws attention to papers which lately have provided support to his theory. Hamilton FAIRLEY and MACKIE (this *Bulletin,* Vol. 23, p. 795) assert that dietetic treatment alone will cure sprue and deny the etiological significance of *Monilia Ashfordi,* which like other Monilias is a saprophyte in the acid faeces of sprue patients. MINOT and MURPHY (*Jl. Am. Med. Assoc.,* 1926, Vol. 87, No. 7) report very good results in cases of pernicious anaemia by treatment with a diet similar to that which Elders recommended in sprue, and KOESSLER, MAURER and LOUGHLIN (*loc. cit.*) produce experimental evidence that lack of vitamins in rats causes an abnormal permeability of the intestinal wall for toxins producing anaemia. Elders finds confirmation of his theory in these articles.

W. J. Bais.

COWEN (S. O.). **Pernicious Anaemia or Sprue.**—*Med. Jl. Australia.* 1926. Dec. 4. 13th Year. Vol. 2. No. 23. pp. 769–771. With 1 chart in text. [11 refs.]

This is an account of the clinical history of a patient—a lady, aged 65—in whom the diagnosis was pernicious anaemia and sprue. As the patient had lived in India some twelve years previously, the suspicion that she might have the latter disease had some foundation. The differential diagnosis of the two anaemias is discussed at some length without adducing any new facts. The Price-Jones cell measurement curve differed little from the normal. Though the patient suffered from glossitis and buccal ulceration, no details of faeces examination are given and it is concluded that the author was really dealing with an instance of pernicious anaemia of the aplastic type.

P. H. M–B.

WARD (Gordon). **Sprue and Addisonian Anaemia.**—*Lancet.* 1926. Aug. 21. p. 408.

A note in which attention is drawn to the paper by NEWHAM and MORRIS (see this *Bulletin,* Vol. 23, p. 797). The glossitis and gastro-intestinal symptoms of addisonian anaemia are not necessarily dependent on the primary anaemia, but may be produced by haemolysis in the portal area. Ward does not agree that the oral administration of arsenic in sprue is harmful; he has observed great benefit from it in the anaemia of that disease.

P. H. M–B.

MORRIS (R. M.). **Some Observations on Urobilin Output in Sprue.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 290–302. [16 refs.]

In sprue the study of urobilin is two-fold. Firstly, the characteristic colour of the freshly-voided faeces excites interest in the stool-pigments; secondly, its presence in the urine is important on account of the anaemia which may accompany this disease. Urobilin itself is a labile substance; hence from a chemical standpoint there may be several varieties. The main tests are JAFFE'S fluorescent zinc test and the characteristic absorption band in the green-blue zone of the spectrum. The relationship of urobilinogen to urobilin may be shown as follows. Bilirubin—→urobilin--→ urobilinogen. For the last the main test is Ehrlich's aldehyde reaction. As a routine, this reaction was performed on a 24-hour specimen of urine; and a portion of the total quantity of faeces passed by the patient was examined daily for seven days. The amount of urobilinogen present is estimated by TERWEN'S colorimetric method. The details of procedure in both urine and faeces are given: in the former the amount of urobilin, in the latter that of *urobilinogen,* expressed as *urobilin,* is estimated. The figures obtained from a study of individual sprue cases would seem to show that the ratio of urobilinogen to urobilin is very high in sprue, and that the actual amount is much increased in those cases with anaemia. It is stated that leucobilin—or leuko-urobilin, which was described as the colourless pigment of the sprue stool, is synonymous with urobilinogen. The change of colour of the stool when exposed to light is due to the oxidation of urobilinogen to urobilin. The percentage of the total products present as urobilinogen varied from 68–91·75, while in a control surgical case it was 42·2. The relation of the urobilin output to the blood breakdown can be estimated by a series of calculations. The normal amount of urobilin excreted per diem is 150 mgm. derived from 153 mgm. of haematin, and it can be calculated that all the haematin in the body can be destroyed in about 140 days. In three sprue cases analysed in this manner it was estimated that blood was being used from 1·4–4·9 times as rapidly as in a normal man.

P. H. M–B.

THAYSEN (Th. E. Hess). Die nichttropische Sprue. **[Non-tropical Sprue.]**—*Klin. Woch.* 1926. Nov. 12. Vol. 5. No. 46. pp. 2168–2172. [1 ref.]

In 1922 the author investigated a case of sprue in a man who had never travelled outside Europe and in the course of the next three years saw three others, all residents of Denmark. Non-tropical sprue cannot be differentiated from the type disease. Having encountered now five cases in all he is of the opinion that the disease is very widespread and many cases are mistaken for pancreatitis or other affections of that organ. The symptomatology resembles very closely that of the tropical form. It usually occurs in patients who have suffered from chronic diarrhoea for years. The early morning diarrhoea and the initial bilious diarrhoea, the loss of weight in non-tropical cases were every bit as striking as in the classical disease (one patient had lost 60 lbs. altogether) ; the shrinkage of the liver dullness and the obvious meteorism were the same. In two cases acute glossitis with aphthae was apparent ; in the others it appears to have been less striking. In two also there was an accompanying anaemia of the pernicious type. The proportion of fat in the faeces was as high as 44 per cent. Non-tropical sprue runs the same prolonged course. One patient had suffered from symptoms for 19, another for 6 years. Treatment with fruit and raw meat gave better results than milk alone. For the neutralization of the acidity of the faeces calcium carbonate and calcium phosphate proved most useful.

P. H. M-B.

SHEPARD (Charles A.) & FLEMING (Wm. D.). **Sprue treated by Calcium Lactate and Parathyroid Extract. Report of Four Cases.**—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 443–450. [6 refs.]

Without entering into the question of etiology, the authors note that *Monilia psilosis* was found by culture once only in four cases. They do not consider that as an addition to the calcium parathyroid therapy the question of diet has been given sufficient emphasis by SCOTT. The effect of starch or sugar in the diet suggests that in part the symptoms arise from fermentative processes in the intestinal tract. In the four cases of sprue reported, three were cured and the fourth greatly improved by the administration of calcium lactate with parathyroid extract, together with a diet, limited at first to milk, and later with the avoidance of excess of sugar, starch and fat The stomatitis was cured by the local application of arsphenamine.

P. H. M-B.

CAMBESSÉDÈS (H.). A propos d'un cas de séquelle de sprue. (Le régime dans la sprue.) **[A Case of Recurring Sprue. Regime of Treatment.]** *Rev. Méd. et Hyg. Trop.* 1926. Nov.–Dec. Vol. 18. No. 6. pp. 161–164.

This is a lengthy account of a single case of sprue which, originating in that well-known endemic focus of the disease—Bombay, was treated with some success there in 1924 on a diet of milk and oranges. A relapse recurring in France in February 1925, the dietary was completely recast, milk being eliminated and full doses of pancreatin being exhibited. Great improvement is said to have taken place, although no details are given.

P. H. M-B.

# MEDICAL ZOOLOGY.

FAUST (Ernest Carroll). **Parasitic Infections and Human Disease in China.**—*Arch. Path. & Lab. Med.* Chicago. 1926. Aug. Vol. 2. No. 2. pp. 223–240. With 1 map. [50 refs.]

This is a valuable digest of the parasites and parasitic diseases of man in China; it does not contain any new observations of fact, but is a comprehensive collection of scattered facts carefully analysed and systematically united. The prologue contains a description of the main physiographical features of the country, a discussion on the inter-relations of parasite and intermediary or reservoir hosts and man, and a brief statement of native economic circumstances that conduce to the distribution of parasites and spread of parasitic diseases. In a concluding generalization the author distinguishes in his survey five noso-geographical areas in the Far East—a tropical oriental, a subtropical oriental, an intermediate (between oriental and palaearctic), a palaearctic, and a dry palaearctic (for the arid plains of north-western China and Mongolia). In the body of the paper the parasitic diseases and parasites of man in China are catalogued in parasitological order, with, in each case, relevant notice of the biology, pathology, and areas of incidence. The noso-geographical division of the country, showing the distribution of parasitic diseases, has been found useful in hospital diagnosis.

A. Alcock.

DESCHIENS (R.). Comment dépister les infections parasitaires du tube digestif. [**How to hunt for Intestinal Parasites (in Stools).**]—*Presse Méd.* 1927. Jan. 1. Vol. 35. No. 1. pp. 3–4. [2 refs.]

Since there are periods when intestinal parasites, although present, are not being passed—particularly in the case of Giardia infestations—a series of stools must be examined during at least 8 successive days. The patient should be provided with 8 tubes and some 5 per cent. solution of formol, and directed to preserve a specimen of his daily stool in a separate tube for 8 successive days, using some of the formol in each case as a preservative, and to deliver the whole collection to the physician on the 9th day. To each tube should be attached a ticket with the patient's name and the date of collection. The specimens can then be examined individually, or mixed, washed and purified by levitation, and centrifugated.

A. A.

BECKER (Elery R.). **Detection of Intestinal Protozoan Infections by the Cultivation Method.**—*Jl. Parasit.* 1926. June. Vol. 12. No. 4. pp. 219–220. [2 refs.]

The author, from examination of faeces of 110 patients in a mental hospital in New Jersey, concludes that for the detection of *Trichomonas hominis* the culture method is better than the smear method, but that for *Chilomastix mesnili* the culture method should be supplemented by the smear method. The only unusual observation about the other intestinal protozoa noted is the abnormally high percentage (36·8) of *Entamoeba coli* cysts.

A. A.

TOCHIHARA (Isamu). **Studies on Intestinal Protozoa.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 231–232.

The author has made a single examination in each instance of the stool from 103 Japanese soldiers and 454 Japanese agriculturals for intestinal Protozoa, and has found infestation both heavier and more diversified in the agriculturals. Of 124 of the latter he made a further examination in each instance six-times repeated, and the following are his findings in this more searching series: Infestations with *Entamoeba coli*, 54 per cent.; with *E. nana*, 62·0; with *Dientamoeba fragilis*, 41·1; with *Iodamoeba williamsi*, 9·7; with *Giardia intestinalis*, 4·8; with *Chilomastix mesnili*, 0·8; with undetermined flagellates, 3·2.

A. A.

THEILER (A.) & DU TOIT (P. J.). La transmission des maladies, dont les tiques sont les vecteurs, par l'injection intrajugulaire d'une émulsion de l'hôte intermédiaire. [**The Transmission of Tick-Conveyed Diseases by Intrajugular Injection of Tick Emulsion.**] —*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 725–737.

The conclusions of the controlled experiments here recorded are that the Rickettsia of heart-water can be transmitted to susceptible animals by intrajugular injection of an emulsion of infected nymphs of *Amblyomma hebraeum*. Also that the *Theileria parva* of East Coast fever can be transmitted by intrajugular injection of an emulsion of infected adults or nymphs of *Rhipicephalus appendiculatus* that have had an infective feed of 72 to 120 hours' (a mean of 96 hours') duration.

A. A.

METALNIKOV (S.). Contribution à l'étude de l'immunité chez les invertébrés. [**Immunity in the Invertebrata.**]—*Ann. Inst. Pasteur.* 1926. Sept. Vol. 40. No. 9. pp. 787–826. With 9 text figs. [Refs. in footnotes.]

The argument of this paper is based more on ingenious ratiocination, mostly from some generally-accepted truths, than on any very novel experimental data. In his large conception of immunity the author distinguishes: (1) The immunity acquired by an organism in its gradual adaptation to an uncongenial medium, a chemical poison, or a bacterial toxin—which he defines as "immunity of adaptation" by abated cell sensibility; (2) the immunity to microbes (and to alien albuminoid substances) acquired by an organism as a result of the active resistance of its cells—both leucocytes and fixed tissue-cells—which he defines as "active immunity" of defence by exalted cell-sensibility; and (3) the reactions manifested by an organism to uncongenial elements in the medium—which he designates "passive immunity" (of defence by heightened cell-sensibility). Reflex excitation of tears and mucus and other secretions, sneezing and coughing and intestinal spasm, the refusal of particles of carmine by an Infusorian that has learnt by experience that carmine is indigestible, the employment of its nettle-cells by a polyp—all these, as instances of defence by a sort of passive or instinctive super-sensibility, are included in his general conception of immunity.

To understand immunity, he says, study must be made of the defensive reactions of all the different cells of the organism, as well as the influence of particular organs, of humours, and of the nervous system.

Among invertebrates as among vertebrates microbes are overcome by phagocytosis (by leucocytes of divers kinds and by fixed tissue-cells) and, more rarely, by bacteriolysis ; by enshroudment and encapsulation in giant cells ; and by elimination in pus and other excretions. There appears to be no difference in principle between invertebrates and vertebrates in these respects, except that " passive immunity " and " immunity of adaptation " are more predominant in invertebrates.

A. A.

HEGNER (Robert W.). **The Biology of Host-Parasite Relationships among Protozoa living in Man.**—*Quarterly Rev. Biol.* 1926. July. Vol. 1. No. 3. pp. 393–418. With 1 text fig. & 3 plates. [64 refs.]

——. **Host-Parasite Relationships among Human Protozoa.**—*Proc. Roy. Soc. Med.* (Sect. of Trop. Dis. & Parasit.) 1926. Sept. Vol. 19. No. 11. pp. 41–44.

These two papers cover the same ground—a familiar ground—and the second is an outline and abstract of the first, plus a few remarks upon the rational basis of prevention and control. The protozoa that live and move in man are enumerated and classed according to their field of action, and their natural history is followed out, the analysis including ways and means of invasion, course and spread of infection in the host, reactions and adjustments of host, effects on host, ways of escape from host, and specific reciprocity of host and parasite.

It is rather strong meat for the novice ; its sweetness is for the man who has time to think.

A. A.

HEGNER (R. W.). **The Transmission of Human Protozoa.**—*Science.* 1926. July 9. Vol. 64. No. 1645. pp. 28–34. [24 refs.]

This paper, which is a conspectus of the Protozoa that attack the human body, is an abstract of three lectures delivered by the author at the London School of Tropical Medicine in 1926. The species are set in three squadrons, as they attack severally the intestine, blood, and solid tissues. Of the species of the last sort Sarcocystis alone is mentioned, the significant invasions of the visceral tissues by species of the other two sorts being shut out of the scheme.

A. A.

SERGENT (Edm.), PARROT (L.), DONATIEN (A.) & LESTOQUARD (F.). Prémunition et protozooses sanguines. [**Premunition and Blood Protozoiasis.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 532–536. [10 refs.]

The authors define " premunition " as the state of tolerance or immunity to a *fresh* infection which exists after an individual has passed through an acute febrile phase of that particular infection into a chronic [latent] phase that is consistent with sound health ; a good and common example of " premunition " is afforded by birds that have recovered from an acute invasion of *Plasmodium relictum* but for a long time afterwards retain the latent infection and are resistant to a fresh infection.

In course of time—months or years, according to the species of infection—a specific premunition : (*a*) may pass on to a true immunity, as in bacteria infections ; (*b*) but more often it wears out and the long "premune" individual again becomes susceptible to the specific infection, and *Plasmodium relictum* is a good example of this commoner alternative (*c*) a third possibility has come under the authors' observation—susceptible calves inoculated with a strain of *Piroplasma bigeminum* may attain "premunition" without the intervention of a febrile stage worthy of notice, this phenomenon being comparable with NICOLLE'S "inapparent typhus" (see this *Bulletin*, Vol. 22, p. 975).

The authors remark the diagnostic and preventive aspects of "premunition"—the latter aspects particularly in the case of malarial fevers. In the fact that colonial-bred Europeans [Eurasians and Eurafricans] and Europeans long-resident in malarious countries display, compared with new arrivals from Europe, a certain show of resistance to malaria they are inclined to see a congruity with "premunition" ; and from this point of view they suggest a diversity of interesting questions, among them the question whether or not it is better for a recent malaria patient, who has perforce to remain in an unhealthy country, to be promptly "sterilized" of his malaria, or merely to be treated for his acute attack and left with a "premunizing" latent infection. The subject is one, the authors remark, that may be commended to those who have to do with the malaria treatment of general paralytics.

A. A.

DOGIEL (V.) & FEDOROWA (T.). **The Action of Carbon Monoxide on Certain Blood Protozoa.**—*Ann. Trop. Med. & Parasit.* 19/6. Aug. 13. Vol. 20. No. 3. pp. 267–272.

The authors think: (1) That since certain Protozoan parasites select the red blood corpuscles of vertebrates for their abode, it may reasonably be assumed that these parasites are in constant need of oxygen ; (2) that a reduction in the oxygen-content of the red blood corpuscles may reasonably therefore be assumed to be harmful to the said parasites ; and (3) that the foregoing assumptions are worth testing by experiment—with a view to possibilities of practical application if they should prove well founded. The authors' experimental method of reducing the oxygen of the red blood corpuscles was the heroic one of administering carbon monoxide by inhalation.

Lizards (*Lacerta vivipara*) infested with a Haemogregarine (Caryolysus) were, by simple methods described, exposed to an atmosphere containing an excess of CO—these reptiles having been found capable of withstanding for a long time an atmosphere containing 7 per cent. of that gas without being poisoned. The individual lizards underwent repeated exposure, being left in CO-polluted atmosphere until symptoms of suffocation appeared, then removed and allowed to recover, and then again subjected to the treatment. Of 5 lizards used 1 succumbed (from "unknown causes"), but in the 4 survivors the numbers of merozoites in the red blood corpuslces were greatly reduced after the treatment. Similar experiments were made with a bird

(*Padda orizivora*) infected with Haemoproteus; it succumbed at the end of a series of 7 experiments, but no reduction of parasites was observed in its red blood corpuscles.

A. A.

Gray (George A.). **Mercurochrome in the Treatment of Intestinal Protozoan Infections: Final Report.**—*Southern Med. Jl.* 1926. Nov. Vol. 19. No. 11. pp. 780–782. [5 refs.]

The author observing of mercurochrome that in addition to having good germicidal powers, it is penetrating and does not precipitate protein nor irritate the kidneys, and having also observed that when given *intra venis* it was eliminated largely by the bowel, conceived it to be well adapted for use in chronic infestations of intestinal protozoa. He here gives the results of his experience of it for this purpose —administered in capsules, *per os*, of ½ to 3 grains, 1 to 4 (preferably 3) times daily, for a term (if possible) of 2 or 3 weeks. It sometimes causes intestinal cramps and nausea, and (when continued) slight stomatitis, and it gives the stools an alarming mahogany or brick-red colour for which the patient should be prepared and indeed be encouraged to expect and to maintain. Systematic examinations, repeated at intervals of 3 to 6 or even 12 months, of stools of patients who had undergone the treatment, gave the following results: Giardia, 20 cases, 16 negative for parasites; Chilomastix, 22 cases, 12 negative; *Entamoeba "dysenterica,"* 13 cases, 5 negative; "Councilmania" 10 cases, 2 negative.

A. A.

Shortt (H. E.). **Note on Cytoplasmic Counter-Staining with Special Reference to Protozoological Technique.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 565–566.

In differential staining, to avoid the attenuation of the counter-stain in the processes of washing and subsequent gradual dehydration through a series of diluted alcohols, the author recommends the use as a solvent for the dye employed as a counter-stain, not water, but some fluid that, besides being an efficient solvent of the dye can be followed directly by the final clearing agent, such as xylol, in which the dye is insoluble. The fluid that answers these requirements is here said to be Weigert's carbol-xylol (1 part pure carbolic acid and 3 parts xylol), where the carbolic acid besides being an effective solvent of the dye has the additional property of extracting any traces of water. From this fluid the tissue can be taken straightway into xylol, for mounting in balsam. "The procedure is eminently satisfactory for almost any staining . . . where separate nuclear and cytoplasmic stains are indicated."

A. A.

Patton (W. S.) & Hindle (Edward). **Notes on Three New Parasites of the Striped Hamster** (*Cricetulus griseus*).—*Proc. Roy. Soc.* 1926. Oct. 1. Ser. B. Vol. 100. No. B 704. pp. 387–390. With 2 text figs. [1 ref.]

The (Protozoon) parasites here described are a Trypanosoma; a Grahamella, in the red cells; and a Sarcocystis, in the muscles of the back and pharynx. All are considered to be new species and are named after their host. The authors remark that *Cricetulus griseus* is remarkably free from ectoparasites, since in the course of examining more than 800 of these hamsters they have noticed them only on three occasions. Once, on an emaciated animal, they met with a large number of lice (Haematopinus), and once a single flea (Ceratophyllus) was caught on one animal and seen (but not caught) on another.

A. A.

DIOS (Roberto L.), ZUCCARINI (J. A.) & WERNGREN (Elsa Tyre). Sobre la existencia de *Trypanosoma minasense* y *Microfilaria* sp. en monos. [*T. minasense* **and a Microfilaria in a Monkey.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1925. Sept. Vol. 4. No. 2., pp. 176–181. With 7 figs. & 1 plate. [5 refs.]

The parasites here described were discovered in the blood of Cebid monkeys—*Callithrix penicillata*—from Paraguay. The trypanosome is identified with *T. minasense* of Chagas ; it is a large form with a tapering, almost filamentous, posterior end and a kinetonucleus placed remarkably far forwards, and it appears to be non-pathogenous to its host. The Microfilaria, which is without a sheath, was very abundant in the peripheral blood.

A. A.

BRUG (S. L.). *Nucleophaga intestinalis* **N.Sp. Parasitic in the Nucleus of** *Endolimax williamsi* (**Prow.**) (=*Jodamoeba bütschli* (**Prow.**).—*Meded. Dienst d. Volksgezondheid.* 1926. Pt. 4. pp. 466–468. [7 refs.]

——. **Sphaerita as a Parasite of** *Entamoeba coli.*—*Ibid.* pp. 469–470. With 26 figs. on 1 plate.

These papers contain illustrated descriptions of two very similar " coccoid " bodies. The first, *Nucleophaga intestinalis*, was found parasitic in the nucleus of *Iodamoeba bütschlii* (...*Endolimax williamsi*) ; it proliferates within the nucleus—which becomes enlarged and at last disappears altogether—and then it invades the cytoplasm ; more than a hundred amoebae were found infected in one slide.

The second, a species of Sphaerita, was found proliferating in the cytoplasm of *Entamoeba coli*. The author remarks its " great similarity " to the first. " If the habitat were not different (in the protoplasm and in the nucleus respectively) the identity of both might be considered."

A. A.

HEGNER (R. W.). **The Protozoa of the Pitcher-Plant,** *Sarracenia purpurea.*—*Biol. Bull.* 1926. Mar. Vol. 50. No. 3. pp. 271–276. [4 refs.]

The author has examined the fauna of ten pitchers of different plants of *Sarracenia purpurea* from different places in Maine and has found in them, collectively, several species representing all three Classes of free Protozoa—a living population. Struck by the phenomenon of a fauna of this sort accommodating itself to a liquid known to contain digestive ferments, the author introduced (under varying circumstances) Paramoecium, Colpoda, and Chilomonas into the pitchers and discovered that they too could live and multiply in the liquid.

A. A.

COVEY (G. W.). [**Protozoan Infections of Bowel in Nebraska.**]—*Nebraska State Med. Jl.* 1926. June. Vol. 11. p. 220. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Aug. 7. Vol. 87. No. 6. p. 441.]

Protozoon infestation of the intestine is believed to be increasing in Nebraska. Among cases observed most of the patients had never been out of the temperate zone. Six cases of infestation by *Entamoeba histolytica* are reported, two of which were directly fatal.

A. A.

HOWITT (Beatrice F.). **The Effect of Certain Drugs and Dyes upon the Growth of** *Endamoeba gingivalis* **(Gros) in Vitro.**—*Univ. California Public. Zool.* 1926. Feb. 16. Vol. 28. No. 8. pp. 173–182. [14 refs.]

——. **Experiments with** *Endamoeba gingivalis* **(Gros) in Mixed Bacterial Cultures; in Filtered Saliva; on a Solid Base; with Peritoneal Cells; and with Digestive Secretions.**—*Ibid.* No. 9. pp. 183–202. With 12 figs. on 2 plates. [7 refs.]

In respect of the experiments on the effect of drugs upon *Entamoeba gingivalis* it is stated, with reservations, that of the substances tested *in vitro* upon cultures of that organism: (1) Stovarsol is the most effective and yatren the least effective; (2) the arsenical are more toxic than the non-arsenical compounds; and (3) emetine hydrochloride is not specifically effective.

In respect of the experiments on the behaviour of *E. gingivalis* in cultures it is stated: (1) That the organism will thrive in the presence of filtered human saliva with a solid substrate of coagulated egg; also in Locke medium having a base of coagulated serum or of agar if the latter has not a too slippery surface; (2) that *E. gingivalis* ingests both erythrocytes and leucocytes of the guineapig, but preferably the former; and (3) that *in vitro* the organism cannot withstand human gastric juice containing the normal amount of HCl (but will survive in fluid deficient in or entirely lacking free HCl), and rapidly explodes in the presence of human bile.

A. A.

CHILD (Horace J.). **Studies on the Ingestion of Leucocytes, and on Mitosis, in** *Endamoeba gingivalis.*—*Univ. California. Public. Zool.* 1926. Feb. 19. Vol. 28. No. 14. pp. 251–284. With 46 figs. on 5 plates & 9 text figs. [15 refs.]

This handsomely illustrated paper contains observations in abundant detail of *Entamoeba gingivalis* obtained from teeth in cases of pyorrhoea. It was observed that the food of this organism consists chiefly of salivary corpuscles and also, to a certain extent, of whole polymorphonuclear leucocytes. Several such leucocytes were observed sometimes to combine to form a giant cell enveloping an amoeba.

A. A.

HILL (Claire McDowell). **The Successful Application of the Culture Method to the Diagnosis of Intestinal Flagellates in the Field.**—*Amer. Jl. Hyg.* 1926. Sept. Vol. 6. No. 5. pp. 646–658. [5 refs.]

In examination of 912 samples of faeces for comparison between the two methods of detecting the two particular species of Protozoa the author's results were as follows, stated in percentage of cases:—

| | | | | |
|---|---|---|---|---|
| Smear method | 5·7 | *Chilomastix mesnili*; | 1·7 | *Trichomonas hominis.* |
| Culture method | 7·1 | ,, ,, | 9·2 | ,, ,, |
| Combined methods, | 9·4 | ,, ,, | 9·2 | ,, ,, |

Trophozoites of neither species were found in *smears* from stools more than 10 hours old; but positive *cultures* of both species were got from stools up to 32 hours old.

The culture-medium used was the Hogue modification of the ovomucoid medium (HEGNER & BECKER, *Journ. Parasit.*, 1922). The smears (two) were stained in dilute eosin, followed by iodine if cysts had been observed. The culture method is considered feasible under field conditions.

A. A.

GUERRICCHIO (Antonio). Anemia grave da *Trichomonas intestinalis*. [*Trichomonas hominis* **Anaemia.**]—*Riforma Med.* 1926. Nov. 29. Vol. 42. No. 48. pp. 1146–1147. [25 refs.]

After notice of numerous authors who have recorded their experience of intestinal flagellates in pathology, the writer describes in considerable detail a case of grave anaemia concurrent with, and concordant in its response to specific treatment for, chronic diarrhoea and a heavy infestation with *Trichomonas intestinalis*. The patient was a native Italian, age 48, who had suffered for about 20 months from profuse diarrhoea, abdominal pains, and other symptoms of gastro-intestinal disorder. On examination the most obvious signs of disease were intense pallor, and oedema of the legs. The number of red blood-corpuscles was reduced to 800,000 and of leucocytes to 2,000. The alkaline, semi-liquid stools contained only an extraordinary number of active flagellates. After preliminary treatment with emetine the case was treated first with stovarsol alone by mouth (50 cgm. daily) and afterwards with stovarsol alternately with injections of atoxyl. Within a fortnight the parasites became scarce and the patient's colour began to improve, and in the course of about 3 months the parasites had disappeared and the number of red blood-corpuscles had increased to 4,500,000, the leucocytes having increased to 8,000 some time before.

A. A.

ESCOMEL (Edmundo). El primer caso de tricomonosis vesical descrito en el Perú. [**The First Record of Vesical Trichomoniasis in Peru.**]—*Cronica Méd.* Lima. 1926. July. Vol. 43. No. 757. pp. 185–189.

——. Un premier cas de trichomonose vésicale décrit au Pérou.—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 697–700.

In this case *Trichomonas vaginalis* was found not at all in the vagina but in the bladder, of a female diabetic, causing pyuria. A suspension of 30 drops of essence of turpentine in the yolk of an egg beaten up with water, with 10 drops of laudanum as a corrective, was injected into the bladder—how often is not stated—during 3 days, after which parasites could not be found.

A. A.

DESCHIENS (R.). Simplification du milieu de Boeck-Drbohlav pour la culture du *Trichomonas*. [**Simplification of the Boeck-Drbohlav Medium for Culture of Trichomonas.**]—*C.R. Soc. Biol.* 1927. Jan. 14. Vol. 96. No. 1. pp. 13–14.

The simplified medium here described is composed of 2 cc. of total egg (manipulated aseptically) coagulated in a sloped tube (at 75° C. for 2 hours) and then covered with 5 or 6 cc. of sterile physiological saline. In this the author has cultivated with ease (at 37° and 20° C.) 3 species of Trichomonas. The culture attains maximum richness on the 3rd day; and although the vitality continues for 6 to 7 days on an average, yet for further continuation in the face of certain oppugnant bacteria the medium should be re-seminated every 4 days.

A. A.

SCHUURMANN (C. J.) & SCHUURMANN TEN BOHKEL STUININK (A.). Essais de culture pure de *Trichomonas intestinalis.* [**Attempts to cultivate** *T. intestinalis* **Pure.**]—*Ann. Inst. Pasteur.* 1927. Jan. Vol. 41. No. 1. pp. 62–71. [55 refs.]

The author gives an account of various (unsuccessful) methods by which he has attempted to purify cultures of Trichomonas, and comes to the conclusion that simple dilution of the medium is all that remains—and patience.

A. A.

KESSEL (John F.). **Trichomoniasis in Kittens.**—*Proc. Soc. Experim. Biol. & Med.* 1926. Dec. Vol. 24. No. 3. pp. 200–202. [3 refs.]

Having satisfied himself by microscopic and cultural examination of their faeces that 69 kittens were "negative" in respect of Trichomonas, the author, working at the Peking Union Medical College, infected 26 of them with Trichomonas from man, from monkey, and from rat, with positive results in 10 out of 14, 2 out of 6, and 5 out of 6 cases, respectively. He also infected 6 of the "negative" kittens with a Trichomonas (morphologically identical with the *T. felis* of CUNHA and MUNIZ as determined by BRUMPT) obtained from the street kittens of Peking, with positive results in 5 instances. In all the positively infected kittens, in both series of experiments alike—as well as in naturally infected street kittens of Peking—the symptoms were acute liquid diarrhoea. The results shake the author's confidence in the specific distinction of *Trichomonas felis.*

A. A.

PARODI (Silvio E.) & NIÑO (Flavio L.). A propósito de la frecuencia del *Chilomastix mesnili* en las heces humanas. [**Presence of** *Chilomastix mesnili* **in Human Faeces.**]—*Semana Méd.* 1926. Dec. 9. Vol. 33. No. 49 (1717). pp. 1520–1522. [16 refs.]

The authors quote the findings of various investigators in different parts of the world and refer to their previous records. PARODI in 1917 found Chilomastix and Trichomonas in 5·33 per cent. of 150 women and in 2·66 per cent. of the same number of children; NIÑO in 1926 reported 1·41 per cent. affected amongst 425 individuals.

They now record that out of 1,955 faecal examinations, carried out at the Central Labaratory of the Clinical Hospital, they have only twice found vegetative and cystic forms of *Chilomastix mesnili,* that is, in 0·102 per cent.

H. Harold Scott.

BOECK (William C.). **Giardiasis in Man. Its Prevalence and Relation to Diarrhea and to Gallbladder Disease.**—*Arch. Intern. Med.* 1927. Jan. 15. Vol. 39. No. 1. pp. 134–158. With 1 text fig. [57 refs.]

This is a review of the subject of Giardia infection and an argument against its pathogenous character. The author concludes from a study of statistics that children are more often infected than adults and that neither in children nor adults does diarrhoea occur more often in infected than in not-infected individuals. The widespread belief that Giardia does cause diarrhoea he explains as either a mere assumption or a fallacious deduction, or else as a conclusion supported by evidence " either meagre and devoid of proper control measures or open to other and as logical interpretations "—evidence " at best quite inconclusive and demanding of more confirmatory observations." He himself once believed from a microscopic study of his own sections that *Giardia microti* caused chronic enteritis in the field mouse, but further study of more carefully fixed material has since led him to change his opinion. His adverse criticism of a mass of experimental and post-mortem evidence cannot be condensed profitably.

In respect of the belief that Giardia initiates or aggravates disease of the biliary apparatus the author is equally sceptical.

" Giardia up to the present time has been found in only one instance in the gallbladder removed at operation. While in children gallbladder disease is extremely rare, the rate of Giardia infection is two or three times as great as in adults in whom cholecystitis is comparatively frequent. Giardia infections occur infrequently in persons with disease of the gallbladder, which is, however, frequently a result of gastro-intestinal (bacterial) infection. The symptoms of cholecystitis are cleared up by cholecystectomy, but when associated with Giardia this organism may persist after operation. Giardia infections may occur in several members of the same family but cholecystitis does not occur in all of them and may never appear." The foregoing are the author's summarized arguments.

" There is no evidence of scientific value at present to support the theory of Barrow that *Giardia lamblia* is concerned in the aetiology of arthritis deformans, certain forms of neurasthenia, melancholia with loss of weight and such symptoms as nausea, vomiting, belching of gas and epigastric pain and tenderness."

[By some extraordinary mischance, which we hesitate to impute even to a compositor, the date (1681) of LEEUWENHOEK'S letter making known his discovery of the intestinal Protozoa of man (*Bulletin*, Vol. 16, p. 89) is here given as 1861.] A. A.

BAUMGARTNER (E. A.). **Giardia (Lamblia) Infestation of Man.**—*Clifton Med. Bull.* 1926. Sept. Vol. 12. No. 3. pp. 98–102. [8 refs.]

Infestation with Giardia was discovered in 42 of 6,715 patients included in the present survey. Among the forty-two, 27 had some gastro-intestinal complaint; 8 had diarrhoea; achylia or subacidity was not frequent; anaemia, as indicated both by proportion of red cells and by haemoglobin, was frequent; many had slight leucocytosis, but few had lymphocyte increase; 7 had disease of gall-bladder, but Giardia was not found in 2 that submitted to operation; and bile-drainages showed very few infected biles. A. A.

GARIN (Giovanni). Lambliosi intestinale ed anemia con speciale riguardo alla forma grave e perniciosa. [**Lamblial Infection and Pernicious Anaemia.**]—*Riv. di Clin. Med.* 1926. Dec. 15. Vol. 27. No. 23. pp. 899–914. [21 refs.]

The author records the case of a man of 51 years who suffered from attacks of diarrhoea, pultaceous, semi-liquid stools, 4 to 10 daily, with loss of weight, cachexia, and anaemia. When seen about a year after the onset, the red corpuscles were between 1½ and 2 million, leucocytes 4,000 per cmm., relative count normal; anisocytosis and poikilocytosis marked. The stools contained Giardia in large numbers and no cause for the anaemia being found, the anaemia is ascribed to the parasites. After 6–7 months' treatment the erythrocytes increased to 3,600,000, and leucocytes to 5,500 per cmm., but the diarrhoea never properly cleared up, nor did the flagellate disappear. Five months later the anaemia became aggravated again, and progressively worse, death ensuing 2½ years after the first onset.

Unfortunately, no post-mortem examination was made.

H. Harold Scott.

CARRERE (J.). [**Lambliasis.**]—*An. Facul. de Med.* Montevideo. 1925. Dec. Vol. 10. p. 999. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Aug. 7. Vol. 87. No. 6. pp. 447–448.]

The wide diversity of abdominal symptoms in Lamblia infestations is noted, and the good effect of an arsphenamine preparation in treatment.

A. A.

GREENWAY (Daniel). *Giardia canis* y *Giardia intestinalis.* [*Giardia canis* **and** *Giardia intestinalis.*]—*Prensa Méd. Argentina.* 1926. Dec. 30. Vol. 13. No. 21. pp. 704–706. [6 refs.]

The author discusses some of the points which have been adduced to regard the Giardia of the dog and other animals as a species different from that found in man. After quoting what various others have written, especially WENYON, DESCHIENS, FANTHAM & PORTER, HEGNER & TALIAFERRO, and giving a table of measurements, he concludes that the morphological differences and the failure to obtain mutual infestation experimentally are not sufficient criteria for separation into two species.

H. Harold Scott.

TALIAFERRO (W. H.). **Variability and Inheritance of Size in** *Trypanosoma lewisi.*—*Jl. Experim. Zool.* 1926. Feb. Vol. 43. No. 3. pp. 429–473. With 12 text figs. [18 refs.]

The author signifies as the " adult " stage of *Trypanosoma lewisi* in the rat that phase, in the course of an individual infection, when the trypanosomes abound in the rat's blood without evidence of growth or fission. In this " adult " stage an individual trypanosome can be made the standard and starting-point of a " pure line," and from such a " pure line," established by the author the experimental studies in variation and heredity in *T. lewisi*, here described and discussed, have been carried on. Descriptions of such studies, however, are too mathematical in expression to be condensed or abstracted, so that we can here take note only of some of the author's propositions and conclusions.

1. Does growing the " pure line " in different rats result in significant difference in size? In three of seven subinoculated rats divergencies in mean size were too remarkable to be fortuitous.

2. Such passage of " pure line " from rat to rat, even in a long series, does not result in significant changes in the variability for size.

3. Passage of the " pure line " through the flea generally results in a very significant increase in variability for total length, but there is no greater effect on mean size than might be expected.

4. Does *T. lewisi* as it occurs in nature consist of many " pure lines." ? Of ten infections got from rats from various places only one showed the high variability characteristic of the pure line after passage through the flea.

A. A.

RODHAIN (J.). *Herpetomonas rhinoestri*, sp. n., parasite des larves de *Rhinoestrus nivarletti* : Rodh. et Beq. [**New Species of Herpetomonas Parasitic in Larvae of** *Rhinoestrus nivarletti*.]—*C.R. Soc. Biol.* 1926. Nov. 5. Vol. 95. No. 31. pp. 1124–1127. With 1 text fig. [3 refs.]

——. Le mode de transmission de *Herpetomonas rhinoestri* Rod. [*Means of Transmission of H. rhinoestri*.]—*Ibid.* pp. 1128–1130. [1 ref.]

*Herpetomonas rhinoestri*, here described and figured, is an intestinal parasite of the larva of *Rhinoestrus nivarletti* (of the Dipterous family Oestridae, or bot-flies), the said larva being in turn parasitic in the African river-hog (Potamochaerus). Since bot-fly larvae are strictly endoparasitic—the larvae of Rhinoestrus being deposited directly upon the mammalian host—and since the parent bot-flies do not feed at all, it is not very obvious how the larvae become infected with intestinal flagellates. The author, attending to this question, finds actual evidence that the ovaries and developing eggs of the adult fly are infected with the Herpetomonas, and he thus accounts for the infection of the larva, by inheritance from the parent. As to the manner of infection of the parent, he assumes transmission in the ordinary course of development from larva to adult, PROWAZEK having already produced some evidence that *Herpetomonas sarcophagae* passes on from the larva to the adult stage of Sarcophaga.

The author draws attention to the suggestive implications of this interesting discovery, in the direction of the pupiparous flies.

A. A.

DA FONSECA (O.) & MUNIZ (Julio). [In Portuguese & English.] Primeiro caso de infecção humana por *Waskia intestinalis* observado no Brazil. Algumas considerações sobre a legitimidade do genero *Waskia*. **First Human Case of** *Waskia intestinalis* **Infection observed in Brazil. Remarks on the Legitimacy of the Generic Name** *Waskia*.—*Sciencia Medica.* 1926. July 31. Vol. 4. No. 7. In Portuguese pp. 362–365. With 1 plate & 1 text fig. In English pp. 366–369.

This is a controversial paper distinguished—mercifully for the reader—by its urbanity.

The authors recently have been able to study very completely, living and stained, the intestinal flagellate described by WENYON and O'CONNOR as *Waskia intestinalis*, and they here figure the active, dividing, and encysted forms of their own observation.

The senior author had previously studied in the same detail an intestinal flagellate from the American cockroach, which corresponded undoubtedly with Miss MACKINNON'S genus *Embadomonas*, but differed from the now observed Waskia, particularly in the fact that the thicker of the two flagella " does not run along the cytostome neither is seen inside of it, but leaves its cavity immediately and runs outward."

The authors therefore dissent from Dobell's opinion that Waskia is identical and synonymous with Embadomonas.

The senior author also refers to the intestinal flagellate of a Brazil monkey described by him as *Waskia wenyoni*. Along with a brief description and figures of this species he gives an account of his early diffidence about its correct relations, and he now re-affirms the conclusion he came to when the genus *Waskia* was described, that it is the normal vegetative or adult form of that genus and not a dividing form. [An opinion in harmony with that originally expressed by Wenyon in the case of the geno-type *Waskia intestinalis*.]

A. A.

Callanan (J. C. J.). **Note on the Finding of** *Embadomonas intestinalis* **in a Kisii Native.**—*Kenya Med. Jl.* 1926. Sept. Vol. 3. No. 6. p. 170.

The author reports this as the first case on record for Kenya, mentioning also a hitherto unreported case observed in a Nandi boy by Dr. G. V. Allen.

A. A.

Andrews (Justin M.). **Coccidiosis in Mammals.**—*Amer. Jl. Hyg.* 1926. Nov. Vol. 6. No. 6. pp. 784–798. [16 refs.]

The observations recorded in this paper were based on cats. The author describes his technique very fully, and his care in getting kittens free from previous infection. The course of coccidiosis in these animals is summarized as follows :—

The period of incubation is from 2 to 4 days ; the duration of symptoms does not usually exceed a week. The period from the time of inoculation until the appearance of oocysts in the stools (what the author calls " prepatent " period) is usually 5 or 6 days ; the period during which oocysts continued present in the stools (" patent " period) averaged about 30 days. There was some indication that the severity of an infection varied directly with the dose inoculated. One attack of a specific coccidiosis appears to confer a specific immunity lasting for 7 months and probably for life.

From a comparison between his own observations in coccidiosis of cats and the case of human coccidiosis reported by A. Connal [see this *Bulletin*, Vol. 20, p. 447] and the congruity of the brief period during which clinical symptoms synchronize with the passage of oocysts in stools, the author is of opinion that human coccidiosis may be not uncommon, but may commonly be overlooked.

A. A.

Krijgsman (B. J.). Wie werden im Intestinaltractus des Wirtstieres die Sporozoiten der Coccidien aus ihren Hüllen befreit ? [**The Excystation of Coccidia Sporozoits in the Host's Gut.**]—*Arch. f. Protistenk.* 1926. Vol. 56. No. 1. pp. 116–127. With 1 curve in text. [16 refs.]

Experiments here described and tabulated show that when *ripe* oocysts (from faeces of guineapig) were exposed to acid pepsin solution their wall was but slightly affected even after 24 hours—indeed was not very much more damaged than by treatment with HCl alone. When exposed to alkaline trypsin solution or to duodenum juice their wall began to wrinkle usually in 6 hours (or less), and by 10 hours they had become emptied. When, however, they were exposed first to the pepsin solution for half-an-hour and then to the solution of the duodenal ferments some of them were found partly empty in 2 hours and had become almost empty in 3 or 6 hours.

A. A.

KRIJGSMAN (B. J.). Die Therapie der Kokzidiose. I. Teil: Die Kokzidiose der Kaninchen. [**The Treatment of Coccidiosis. Part I. The Coccidiosis of Rabbits.**]—*Cent. f. Bakt.* 1. Abt. Orig. 1926. Dec. 7. Vol. 101. No. 1/3. pp. 108–126. With 7 text figs. & 1 plate. [29 refs.]

A good deal of this paper is prefatory and familiar or formal. Rabbits were the subject of experiment, and the therapeutic effect of the two drugs tested was appraised by observations of faeces for cysts. These two drugs were atoxyl and creolin. From the experiments, which are described and graphically illustrated, the author concludes that atoxyl has no effect on coccidiosis. On the other hand creolin had a curative effect in every case and in every stage of the infection, the rabbits, it is to be understood, being kept scrupulously clean and dry and their food and cages undefiled.

A. A.

BECK (Harald). Die pathologischen Veränderungen in der Leber bei Vogelmalaria. [**The Pathological Changes in the Liver in Bird-Malaria.**]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. April 25. Vol. 51. No. 1. pp. 90–98. With 21 figs. on 1 plate. [Numerous refs.]

The observations were made on siskins and canaries. In the series of pathological phenomena the author distinguishes three phases. First—about 8 days after infection—the intracellular reticulum of the liver parenchyma becomes infiltrated with large lymphocytes and other (smaller) forms of extravasated leucocytes. In the next phase—about 14 days after infection—the deposit of malaria pigment begins in the fixed cells, very seldom in the free cells, and owing to the extensive accumulation of extravasated leucocytes in the intracellular reticulum the parenchyma cells shrink. The third phase corresponds with a decrease in the number of parasites observed in the blood; the extravasated leucocytes and the pigment are now resorbed, and the large patches of shrunken parenchyma are reduced to small nodules.

A. A.

DRENSKY (Kosta) & HEGNER (R. W.). **Periodicity in Bird Malaria.**—*Amer. Jl. Hyg.* 1926. Mar. Vol. 6. No. 2. pp. 312–314. With 1 chart in text.

The authors have followed the asexual cycle of the parasite of bird malaria (*Plasmodium praecox*) and they confirm Mrs. TALIAFERRO'S observation of its periodicity. They note that Mrs. TALIAFERRO observed the period to be approximately 24 hours in a strain from a Baltimore sparrow, and approximately 30 hours in a laboratory strain that had been run through canaries for eleven years. In the authors' observations the period from one sporulation to another was 24 hours.

A. A.

GIEMSA (G.), WEISE (W.) & TROPP (C.). Chemotherapeutische Studien met Vogelmalaria (*Plasmodium praecox*). **[Studies on the Chemotherapy of Bird-malaria.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Aug. 1. Vol. 30. No. 8. pp. 334–347. [12 refs.]

The significance of this paper hardly comes into medical zoology. After a general review of previous work on the subject the authors tabulate the effects of 28 different preparations of specified chemical groups, of specified strengths, experimentally tested in the control of Proteosoma infection, including for comparison the known effects of 11 of them in Plasmodium infections of man. The authors' general conclusion is that under corresponding conditions of experiment, and with the employment of an identical strain of parasite, experiments with bird-malaria furnish a safe test of the value of a new drug for the treatment of malaria in man.

A. A.

RODHAIN (J.). *Plasmodium epomophori* n. sp., parasite commun des roussettes épaulières au Congo belge. **[New Species of Plasmodium parasitizing Bats in Belgian Congo.]**—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 828–838. With 2 text figs. [5 refs.]

The new species of Plasmodium here described and figured has been observed as a common parasite of several species of frugivorous bats in Belgian Congo. It is undoubtedly distinct from the two species of Plasmodium observed respectively in frugivorous bats in Australia and India.

A. A.

SATO (Shinichi). **On the Toxic Action of Sarcosporidiotoxin and its Serological Study.**—*Japan Med. World.* 1926. Mar. 15. Vol. 6. No. 3. pp. 62–64. With 4 text figs.

This is an English summary, by the author, of his studes of the toxin of *Sarcocystis blanchardi*, a species said to occur in 56 per cent. of the buffaloes of Formosa. In his experiments the author used an extract of the dried " adult " cysts and cyst-contents (the toxin being soluble in water, in normal saline, and in glycerine).

The author has evidently made a very full and careful study, but his account of it is not as clear as it might be, and some of his terminology is ambiguous, particularly his use of the term " toxin " to include a specific toxin (also called a toxic principle) and its " antagonistic substance " as well as other toxins. This very broad use of the term tends to confuse the interpretation of the adjectival " toxicity." It is clear, however, that the specific toxic principle is destroyed by heat at 50°C. for 30 minutes, by $CO_2$, and by acids (particularly HCl), but is resistant to alkalis ; is inert when swallowed or injected into the bronchi, weak when injected into the brain and weaker still into the peritoneum, but very active (in susceptible animals) when injected into the blood. The rabbit is particularly susceptible, the M.L.D. *intra venis* being 0·00005 gm. per kilo of bodyweight. Toxic symptoms—excitement, " paralytic collapse," and severe diarrhoea—ensue in about half an hour and death occurs in about 10 hours. The author enumerates all the post mortem pathological changes at great length and infers therefrom that the toxic principle acts on the adrenal glands, the liver, the intestinal walls, and the heart. When the " toxin " [? extract of cyst] is brought in contact with a piece of any of these tissues *in vitro* the " toxicity " [manifestation of the " toxic principle "] disappears, or is very much reduced. Rabbits may be brought to a very high degree of immunity in the usual manner, but their immune serum, although it neutralizes the " toxin " *in vitro* does not always do so completely *in vivo.*

A. A.

DA MATTA (Alfredo). Dermatite produsida por larvas tartaranas ou lagarta de fogo. [**Dermatitis due to Caterpillar Larvae.**]—*Bol. Inst. Brasileiro de Sciencias.* Rio de Janeiro. 1926. July 1. Vol. 2. No. 7. pp. 255–262. With 2 figs.

——. A phytotherapia em clinica dermatologica e pediatrica.—*Ibid.* Aug. 10. Vol. 2. No. 8. pp. 275–278.

Two cases of acute dermatitis due to the hairy caterpillar of *Megalopyge lenata* are recorded. The first, a man, immediately experienced on contact a sensation of heat, followed by painful itching, swelling and acute inflammation. Twenty-four hours later there was a vesicular eruption which persisted for three days, but did not clear up entirely for ten days. In the second, a girl, the sensations and symptoms were similar but more severe.

In the second paper, the author states that local application of the leaves of the dahlia rapidly reduces the inflammation.

The tuber of *Dahlia variabilis* employed as a poultice is of value in other inflammatory conditions, such as cellulitis on the way to abscess-formation. Its alcoholic extract is also recommended for insomnia, nervous excitement, palpitation and as a general sedative in the complaints of infancy.

H. Harold Scott.

MAZZA (Salvador) & FRÍAS (Dardo). Nota sobre accidente producido por larvas de " *Hyperchira coroesus* " (rupa chico). [**Symptoms produced by Larvae of** *H. coroesus.*]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. No. 14, 15 & 16. 5 pp. With 1 text fig. [4 refs.]

The larva of the lepidopteron, *Hyperchira coroesus,* is 4–6 cm. in length by 1 cm. broad, of an emerald green colour and covered dorsally by closely-set up-standing hairs. It lives on bushes known locally as *guaranguay* (*Stenolobium garrocha* Fries, and *S. stans* Juss). The patient, a child of 3 years, was " stung " on the left lower eyelid by one of these larvae. There was much pain and a wine-red spot appeared, the size of a centavo piece. Similar spots soon arose over the whole face, not disappearing on pressure ; the skin was oedematous, the lid itself to such an extent as to impede vision. The swelling and redness did not completely disappear for 3 days. Constitutional symptoms were practically absent. The inhabitants are well acquainted with this accident and treat it by the local application of vinegar.

H. Harold Scott.

ILLINGWORTH (J. F.). [**Distressing Itch from a Moth,** *Euproctis flava* **Bremer, in the Orient.**]—*Proc. Hawaiian Ent. Soc.* Honolulu. 1925. July. Vol. 6. No. 2. pp. 267–270. [8 refs.] [Summarized in *Rev. Applied Entom.* 1926. Oct. Vol. 14. Ser. B. Pt. 10. pp. 182–183.]

The author reports a statement that whole villages in the neighbourhood of Yokohama may be incapacitated by epidemics of the irritating rash caused by contact with the hairs of the moth *Nygmia* (*Euproctis*) *flava.* The moths are attracted to lights and may get among bedclothing, where the hairs that they shed may remain virulent for weeks. [On the stinging-hairs of this and other moths and their caterpillars see this *Bulletin,* Vol. 19, p. 843; Vol. 20, pp. 472, 800, 801; Vol. 21, pp. 436, 789; Vol. 22, pp. 913, 917; and Vol. 23, p. 295.]

A. A.

CHAPIN (Edward A.). **A New Paederus (Coleopt.: Staphylinidae) causing Vesicular Dermatitis in Man.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 369–372. [13 refs.]

The little Staphylinid beetles of the genus *Paederus* are now well known to emit a secretion that produces an irritating vesiculous eruption of the human skin. Several species, altogether 7 in number, distributed in tropical America, Europe, tropical Africa, India, and Java, have already been convicted of openly exercising this offensive power and 2 other species have been proved in the laboratory to have the same capacity. Under the indistinctive specific name *irritans* a tenth species is here described as causing epidemics of dermatitis in camps in Ecuador.

A. A.

WADA (Hiratake). Klinische und experimentelle Untersuchungen ueber die durch den Giftkäfer (*Paederus riparius* L.) verursachte Dermatitis und ihre Aetiologie. [**Aetiology of the Dermatitis caused by the Poison Beetle, Paederus.**]—*Japan. Jl. Dermat. & Urol.* 1926. Nov. Vol. 26. No. 11. German summary pp. 68–70. [In Japanese pp. 1044–1061. With 2 text figs. 8 refs.]

The author, in describing in much detail the dermatitis caused by *P. riparius,* states that he has found a pair of organs resembling glands in the penultimate abdominal segment of the insect. The irritant toxin, however, exists in all parts of the body [? blood], and is not confined to the region of the glands.

A. A.

BOGEN (Emil). **Arachnidism: Spider Poisoning.**—*Arch. Intern. Med.* 1926. Nov. 15. Vol. 38. No. 5. pp. 623–632. With 3 text figs.

The genus *Lathrodectes*(λαθροδηκτης=biting secretly)—often wrongly spelt "Latrodectus"—is widely distributed round the warmer zones of the globe and some of its species are notoriously venomous, their bite being fatal to small mammals and occasionally, it is said, to man himself. They are small but rather plump spiders, with long but coarsish legs, and are of a blackish colour with a somewhat alarming display of bright red or orange markings on the abdomen. The author, who speaks of experience of 15 cases of "poisonous spider bites" (apparently or presumably inflicted by the notorious *Lathrodectes mactans*) treated in the Los Angeles Hospital, and includes in his survey 150 cases reported by thirty-three physicians in the U.S.A. during the last century, gives here (see also this *Bull.*, Vol. 23, p. 875) a comprehensive review of the behaviour of that particular species ; but unfortunately his references to original papers have not been included in this article though they are stated to be present in reprints of it.

We quote his " Report of a typical case " :—

" One late summer evening, a young Mexican labourer, while sitting down in an infrequently used outdoor toilet in a suburb of Los Angeles, felt a sharp prick on the end of the glans penis. On looking down he saw a coarse web spun across the hole in the seat of the toilet, and a shiny black spider with a red spot on its belly scurrying to a corner of the web. After the first momentary stinging he felt no further pain in the penis, but about ten minutes later he began to feel a cramping, aching pain in the groins which rapidly spread over the abdomen, legs, back and chest, increasing in intensity for about an hour. He arrived at the Los Angeles General Hospital about six hours after the bite, writhing in agony, and complaining of nausea, vomiting, and of some difficulty in breathing.

" The face was flushed, the pupils somewhat dilated, the respiration accelerated, and the knee jerks and other reflexes overactive. The abdominal wall was extremely rigid, suggesting the boardlike rigidity of a perforated gastric ulcer, although there was no marked local abdominal tenderness. A tiny red spot, barely discernible, marked the spot where he had been bitten. The temperature was normal on admission, but rose to 100·6° F. by the next afternoon, while the pulse, which was 100 on admission, fell to 64. The blood pressure was 160 systolic and 90 diastolic, but fell to 130 systolic and 80 diastolic within twenty-four hours. A trace of albumin and a few hyaline casts were found in the urine. The patient had no bowel movements until after he had been given a cathartic on the second day, and he had some difficulty in voiding urine on the first day. The white blood count was 15,000 on admission, with 80 per cent. of polymorphonuclear leukocytes, but this dropped to 9,000 by the third day, with 70 per cent. of polymorphonuclears. The red blood count was normal, with a colour index of 1.

" Several hypodermic injections of morphine were given before the patient secured any relief from the pain, and an interrupted restless sleep followed the additional administration of 3 grains (0·1 Gm.) [*sic*] of phenobarbital. The morning after admission he was bathed in a profuse cold sweat, and complained of more pains in the feet and legs, and a numbness that persisted for several days in the soles of the feet. By the second day he was able to sit up, and four days after the onset of symptoms he left the hospital, walking but still weak and afflicted by a little numbness and tingling of the feet."

A. A.

Brazil (Vital) & Vellard (J.). Contribuição ao estudo do veneno das aranhas (Continuação). (Segunda memoria). *Lycosa raptoria* —*Ctenus nigriventer* Genero *Latrodectus*—Genero *Grammostola* —*Lasiodora curtior* e *Acanthoscuria sternalis*. **[Contribution to the Study of Spider-Venom (Pt. 2*).]**—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 243–294. With 23 figs. on 11 plates. French summary pp. 295–299. [8 refs.]

In these experimental studies the venom of the following South American spiders has been observed :

*Lycosa raptoria.*—The direct action of the venom is entirely local, causing intense pain and extensive superficial necrosis.

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* For Part 1 see this *Bulletin.* Vol. 23. p. 301.

*Ctenus nigriventer.*—The general effects of the venom are shown in tachycardia and lowered temperature, cramps, convulsions and intense shooting pains, profuse sweat, and anuria—and are sometimes fatal.

*Lathrodectes mactans.*—The venom is neurotoxic, causing hyperaesthesia, intense shooting pains, tremors, paroxysms of cramp, and then paralysis, dyspnoea, and death.

*L. geometricus.*—The venom is generally similar to that of *L. mactans*, but is less virulent.

*Grammostola acteon.*—This is one of the largest of the Aviculariidae and is very common in southern Brazil. Its venom has hardly any effect on warm-blooded vertebrates but is extremely active for cold-blooded animals, particularly for snakes, upon which it feeds.

*Lasiodora curtior*, another very large Aviculariid, has venom similar to that of the Grammostola. It feeds on lizards and frogs.

*Acanthoscuria sternalis.*—A smaller Aviculariid ; its venom is said to cause excitement and hallucination followed by paralysis, but to be not very potent ; in an observed case in man it did not cause any serious effects.

A. A.

VELLARD (J.). Contribution à l'étude des araignées. Nouvelles espèces d'Argiopidae. **[New Spiders from Brazil.]**—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 327–331. With 2 text figs. & 1 plate.

A new species of Glyptocranium (*G. fragoides*), one of the two Brazilian spiders here described, is said—unlike its congener *G. gastracanthoides*—to have venom that is little toxic.

A. A.

LANG (Milton C.) **A Case of Scorpion-Bite.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 553–554.

Reported from the Central Provinces of India, where scorpion sting is said to be not uncommon but very seldom serious. The victim was a young man, and he was stung in the big toe. When seen, 15 minutes after the accident, he was in great pain and suffering from shock, but there was no local swelling. Presently there was urgent but ineffective desire to micturate, complaint of severe pain throughout the body, vomiting, cough with blood-stained expectoration, cyanosis, loss of radial pulse, and the cold sweats of approaching mortality. Under appropriate treatment for shock the patient was restored in the course of 2½ hours, but he remained unfit for work for two days. Successive examinations of urine showed that there had been a distinct, though transient, affection of the kidney as an effect of the scorpion venom—besides the transient effect upon the lungs. Sugar was not detected in the urine.

A. A.

D'ABREU (A. R.). **Effects of Bee Venom.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 545–549.

The author, in Lahore, remarks the diversified symptoms that follow injuries inflicted by bees and wasps and illustrates the diversity by 5 cases. (1) A lady was stung on head, hands and arms by a sudden fall of bees from overhead. Though the individual stings were not acutely painful she was immediately smitten with an intolerable headache. About half-an-hour afterwards there set in symptoms as of violent cholera—watery diarrhoea and vomiting, abdominal cramp, thirst, and collapse—lasting altogether 5 or 6 hours. Some pain from the stings was afterwards felt, and small hard lumps arose where stings had penetrated, the lumps lasting 10 or 12 days, but there was no general swelling or urticaria. (2) A lady travelling by road was furiously pursued by wild bees. She was rescued eventually by the ingenious and self-oblivious intervention of a poor Indian coolie, but not before she had been overwhelmed with stings on head and neck and arms. Her first complaints, afterwards, were an unquenchable thirst and a feeling of weight and " acute numbness " of the injured regions, but not any stinging pain. There was no general swelling or rash, but small hard lumps marked the sites of puncture by individual stings. About 12 hours after the struggle (during the night) the victim was semi-delirious, fevered, and in profuse perspiration. The following morning she felt well. The lumps remained for 3 to 5 weeks afterwards, feeling " frozen and numb " on pressure. (3) A man stung in a superficial vein of the foot, by a single bee, suffered serious embarrassment of breathing besides local swelling and urticaria. (4) A female patient prone to urticaria and susceptible to the smallest dose of quinine suffers severe urticaria if stung by a bee or wasp. (5) Another (male) patient with an unexplained susceptibility to urticaria suffers only local pain and swelling from a sting.

A. A.

HASE (Albrecht). Ueber die Giftwirkung der Bisse von Tausendfüssen. [**On the Action of the Venom of Centipedes.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. Aug. 5. Vol. 99. No. 4–5. pp. 325–332. With 4 text figs. [28 refs.]

The author has tried conclusions with the venom of some species of small European centipedes—*Lithobius insignis, Scolopendra cingulata,* and *S. oraniensis.* Their bite causes a burning pain quickly followed by a somewhat intensely erythematous skin eruption (local) which soon dies away without any serious consequences.

A. A.

KRAUS (R.). Serumtherapie der Bisse europäischer Vipern. [**Serum Treatment of the Bite of the European Viper.**]—*Seuchenbekämpfung.* 1926. Vol. 3. No. 5–6. pp. 233–234.

The author's conclusions from laboratory experiments are that Vital Brazil's antivenene, the immunization product from *Lachesis jararaca* venom, is as efficacious against the venom of the European viper as Calmette's antivenene (the immunization product from the European viper).

A. A.

MORITSCH (Paul). Zur Serumtherapie des Bisse durch europäische Vipern. 2. Mitteilung. [**Serum Therapy of Bites of European Vipers.**]—*Wien. Klin. Woch.* 1926. Dec. 23. Vol. 39. No. 52. pp. 1514–1515.

This appears to be merely a re-statement of the observations of R. KRAUS, noticed above: (1) That the anti-toxic serum manufactured in Brazil for treating bites of S. American vipers neutralizes also the venom of European vipers; and (2) that this serum, as well as CALMETTE's standard antivenene, is curative of the bite of European vipers.

A. A.

LINDSAY (J. W.). **Snake-Bite and its Treatment in South America.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 275–278.

The author says that there are now very few estancias, gerba-matté plantations, or lumber-cutting concerns in Paraguay that are not provided with hypodermic syringes, potassium permanganate, and antivenom serum, with clear instructions for their use. The antivenom sera are the well known antophidic, anti-bothropic, and anti-crotalic preparations of the São Paolo Institute of Brazil. He gives brief abstracts of the successful treatment of five cases of bite by species of Lachesis. In two cases treated locally by injection of permanganate, and otherwise by stimulants and calcium chloride, there seem not to have been any symptoms of poisoning ; the other three cases, in all of which both local and general effects of absorption of venom were manifest, illustrate the remarkable efficacy of the polyvalent antophidic serum.

A. A.

AUSTIN (J. S.). **A Case of Snake Bite.**—*Jl. Roy. Nav. Med. Serv.* 1926. Oct. Vol. 12. No. 4. pp. 310–311.

This case is reported from Ceylon. The man, a naval A.B., wearing shoes and stockings, was bitten on the ankle. A resourceful and devoted shipmate immediately improvised an effective tourniquet and sucked the bite and endeavoured to cauterize it with a lighted match. The injured man walked back to camp, but had some difficulty in finishing the walk. When seen, about an hour after the accident, he was " somewhat collapsed," complained of pain in the abdomen, and was suffering—and continued for some hours to suffer—from constantly recurring vomiting. The only local symptom mentioned is slight general congestion due to the tourniquet. He was treated immediately with 40 cc. of antivenene [presumably Kasauli], large doses of whisky, and local ablution with strong $KMnO_4$. About 6 hours after the accident, when the patient was in bed, he complained of much-limited vision. Ptosis was then noticed. Subsequently difficulty in speaking and swallowing was complained of and observed. On the 3rd day this last symptom was alleviated ; on the 6th day the eyes could be opened to the full and vision was nearly normal ; and on the 7th day the patient felt well. During the 17 days that the patient was in hospital he lost 14 lb. weight.

The snake was not identified. [From the symptoms it could hardly have been other than a krait that had failed considerably in its bite.]

A. A.

WADA (Hiratake). **Pharmacological Studies of Snake** (*Agkistroden Blomhoffi*) **Venom.**—*Japan Med. World.* 1926. Nov. 15. Vol. 6. No. 11. pp. 308–315. With 1 curve in text.

This is a scrutinous study of the venom of the pit-viper *Ancistrodon blomhoffi*, the venom used having been collected, dried, and sealed-up about 14 years before.

The general effect of several lethal doses, as observed in a mouse, is restlessness, within a few minutes, and quickening of respiration ; then, in ten minutes or more, difficulty in walking, and slowed and laboured breathing ; and then, after involuntary defaecation and urination, the breathing stops, though the heart continues to beat for several minutes afterwards. Occasionally there are " cramp-like movements " just before death. There are no haemorrhages in viscera or elsewhere.

The pharmaceutic effects of the venom on the circulation and respiration, on the blood vessels of divers animals and divers organs, on the heart, and on the movements of the intestine are stated, severally, in detail too restricted and too much qualified for concise abstraction; but the noteworthy effects appear to be lowering of blood-pressure, disturbance of respiration, and (in certain doses and certain animals) stimulation of the heart.

A. A.

PHISALIX & MARCENAC. La soi-disant immunité naturelle du chien Sloughi aux venins de scorpion et de vipère ainsi qu'au virus rabique. **[Supposed Natural Immunity of the Sloughi Dog to Scorpion and Viper Venom as well as to Rabies Virus.]**—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 438–440.

The natives of Morocco have a belief, write the authors, that their "sloughi" hound is naturally immune to animal venoms and to the virus of rabies, and the native idea that this miraculously endowed breed is therefore altogether superior to the common cry of curs is too often a hindrance to the run of sanitary decrees against the spread of rabies. The authors, therefore, have formally tested the powers of resistance of the "sloughi" breed to the venoms of a large scorpion (*Buthus mauritanicus*) and a viper (*Vipera aspis*) and to the fixed virus of the Pasteur Institute, and they find them to be over-rated in the case of the scorpion venom and non-existent in the other two particulars. An adult "sloughi" (but not a pup) can tolerate the venom of a single scorpion, an amount that is sufficient to kill an ordinary dog of corresponding weight; but the venom of three scorpions is fatal. In the case of the viper venom and the fixed virus the "sloughi" was killed in the same way and in the same time and by the same lethal dose as the ordinary dog. The probable explanation of the "sloughi's" reputation, according to the authors, is that scorpions do not meddle with it because of its rough ill-favoured skin and hair.

A. A.

CRIMMINS (Martin L.). **Collecting Rattlesnake Venom to be used in making Antivenin Serum.**—*Jl. Amer. Med. Assoc.* 1926. Nov. 13. Vol. 87. No. 20. p. 1645. With 3 text figs.

The venom, expressed from the reptile in the usual way, is rapidly centrifugated for 15 to 30 minutes, when it separates into four layers; the upper two are removed and dried in an incubator at 37C° for 2–4 days.

It is stated that about two ounces of liquid venom, the yield of 200 specimens of *Crotalus atrox*, produced one ounce of dried "crystallized" venom.

A. A.

BRAZIL (Vital) & VELLARD (J.). Contribuição ao estudo das glandulas das serpentes aglyphas. **[Study of Salivary Secretion of Aglyph Snakes.]**—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 301–322. French summary pp. 323–325. [17 refs.]

[It is well known that the salivary secretion of numerous species of Opisthoglyphous Colubridae is decidedly toxic, causing in laboratory animals symptoms a good deal like those caused by dilute cobra-venom; also that the saliva of some species of Aglyphous Colubridae is toxic, causing general convulsions.]

The author has experimented with the saliva of five S. American species of Aglyphs, namely *Drymobius bifossatus, Herpetodryas carinatus, Helicops modestus, Xenodon merremii,* and *Spilotes pullatus.* That of the last on this list is said to be hardly at all toxic; that of the first two to cause paralysis but not to be haemolytic or coagulant; while that of the two others, being also neither haemolytic nor coagulant, is otherwise toxic only for batrachia.

They have also made experiments with the saliva of the Boa constrictor and of a species of Amblycephalidae; the former he finds to be non-toxic, while the latter is feebly neurotoxic but causes very extensive local sphacelation.

A. A.

ROYER (M.). Étude des cellules sanguines, de l'hémoglobine de la bilirubine et de l'urobiline dans l'anémie hémolytique par le venin de cobra ou la lysocytine. [**Study of Blood Cells, Haemoglobin, Bilirubin, Urobilin in Cobra Venom Haemolysis.**]—*C. R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. pp. 1375–1377. [1 ref.]

Observation of the haemolytic action of cobra venom is often interrupted by the intervention of the toxic effects.

Soon after the injection of venom the number of white cells is increased and the number of red cells very much diminished. The increase is great in polynuclears, little in mononuclears; neutrophile myelocytes and eosinophiles appeared in one instance; platelets are considerably decreased. In the red cells there is slight anicytosis, hyperchromasia, and rare occurrence of haematoblasts. There is a large, but temporary, increase of haemoglobin value, showing that the freed haemoglobin is temporarily fixed by red cells; but in certain cases haemoglobinuria follows. Faecal urobilin is considerably increased in the subsequent course of events. Bilirubinuria was never observed. The urobilin normal to bile disappears quickly, but is increased in the urine. The bilirubin of the bile is remarkably augmented. The appearance of faecal stercobilin was observed in three cases after administration of lysocytin. The animals used in the experiments were dogs.

A. A.

MARCENAC (M.). Arachnides, myriapodes et serpents de la région du Tadla (Maroc). [**Spiders, Centipedes and Snakes of the Tadla Region, Morocco.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 560–563. [3 refs.]

The territory of Tadla in Morocco is described and its three physiographically well-defined regions—a stony waste plateau, with a desert fauna, to the north; the hot, dry, shut-in valleys of the Atlas, also with a desert fauna, and a teeming womb of snakes, to the south; and between the two a great well-irrigated fertile plain, less troubled with venomous creatures than the other regions.

Of the unpleasing elements of the Tadla fauna the following are mentioned: *Buthus mauritanicus,* a blackish scorpion, very common in summer and autumn, much feared for the serious effects of its sting, which, however, is fatal (sometimes) only to children; *Heterometrus maurus*, a scorpion less common and less venomous than the other; *Galeodes olivieri*, a "jerrymunglum," like Ancient Pistol terrible only in aspect; *Scolopendra morsitans* var. *scolopiana*, and *Orya barbarica*, two centipedes whose venom merely causes irritation; *Scaphiostreptus maroccanus*, a millipede, like all of his kind quite harmless; and 3 or 4 species of snakes, of which the venomous species have not been certainly identified but are probably *Vipera lebetina* and (or) *Bitis*.

A. A.

BURGESS (John). **Sting Ray Injuries.** [Correspondence.]—*Med. Jl. Australia.* 1926. Oct. 2. 13th Year. Vol. 2. No. 14. pp. 465–466.

This letter is inquisitive rather than informative. The writer mentions three cases of wounding by stingrays. In all three intense pain was felt, and is described as spasmodic in one case; in one case symptoms also of shock were noticed. In one instance the offending fish was caught; [from the incomplete description it seems to have been a very young individual].

A. A.

PEREIRA (Jayme R.). Sobre a acção physiologica do veneno do sapo. III-Veneno do sapo (*Bufo marinus*) e musculo liso. [**Action of Toad Venom on Unstriped Muscle.**]—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 177–184. With 6 text figs. [13 refs.] French summary p. 185.

Certain authors having on chemical evidence reported the presence of adrenalin in the venom of the toad, the author, not finding the physiological evidence very clear, has made a comparative study of the action of toad-venom and adrenalin on the unstriped muscle of various viscera of various laboratory animals. He finds that the venom of the toad in dilution of 1-500 to 1-5000 almost always has a stimulant action on unstriped muscle, even after the failure of adrenalin, but in certain cases where the normal tone of the muscle-preparation is high it can bring about an inhibition identical with Wedenski's inhibition.

A. A.

ANNALES DE MÉDECINE ET DE PHARMACIE COLONIALES. 1926. Apr.-May-June. Vol. 24. No. 2. pp. 234–235.—Empoisonnement par la chair de crapaud. (Extrait du rapport médical de juillet 1925 de la Cochinchine.) [**Poisoning by Toad Flesh.**]

It is well known of toads that their cutaneous glands are venomous and that their blood also has been shown to be toxic, and the author here gives evidence that their flesh also is poisonous. Three native children in Cochin China ate some toads, which they had just before killed, skinned, and hastily cooked. Very soon afterwards they were taken with colic, painful vomiting, and profuse diarrhoea. One of them, a boy of 5 years, died at once; another, a girl of 11, died on reaching hospital; but the third, a girl of 8, recovered after the stomach and bowel had been irrigated and stimulants administered.

A. A.

KOPSTEIN (Ph. F.). Die giftigen Tiere von Niederländisch-Ost-Indien. (Zwei Vorträge, gehalten in Juni 1921 im Institut für Tropenhygiene zu Amsterdam.) [**The Poisonous Creatures of Dutch East Indies.**]—*Natuurkundig Tijdschr. v. Nederl.-Indië.* 1926. Vol. 86. No. 2. 24 pp.

This is an interesting essay on an interesting subject, but as it does not go beyond well-known ground or open up any new prospects, nor contain any references to original sources of information, it is not likely to be of much use to English readers.

LÉVY (Robert). Intoxication de l'ecrevisse par les venins de deux myriapodes chilopodes : *Lithobius forficatus* L. et *Cryptops anomalans* Newpt. [**Poisoning of the Crayfish by Venoms of Two Myriapods.**]—*C.R. Soc. Biol.* 1927. Feb. 4. Vol. 96. No. 4. pp. 256–257. [3 refs.]

It is stated that a lethal dose of the venom of the two centipedes specified causes in the crayfish immediate violent contraction of the muscles, followed before death by complete relaxation. The venom of Cryptops is also haemolytic.

LÉVY (Robert). Action antitoxique du sang de *Lithobius forficatus* L. vis-à-vis du venin de la même espèce et vis-à-vis du venin de *Cryptops anomalans* Newpt. [**The Blood of** *L. forficatus* **is Antitoxic to the Venom of this Species and of** *C. anomalans.*]—*C.R. Soc. Biol.* 1927. Feb. 4. Vol. 96. No. 4. pp. 258–259. [1 ref.]

In the author's experiments the venom both of *Lithobius forficatus* and of Cryptops was neutralized *in vitro* by the blood of the former.

HOFFMAN (W. A.). **Irritation due to Insect Secretion.**—*Jl. Amer. Med. Assoc.* 1927. Jan. 15. Vol. 88. No. 3. pp. 145–146. With 2 text figs. [1 ref.]

The author gives his personal experience of the slightly irritant effects of contact with *Loxa flavicollis*, a Pentatomid bug occurring in the West Indies. The irritant secretion appeared to come from the stink-glands.

A. A.

BARRAUD (P. J.). A Revision of the Culicine Mosquitoes of India. Part XIX. The Indian Species of *Aëdomyia* and *Orthopodomyia* with Descriptions of Two New Species. Part XX. The Indian Species of *Armigeres* (including *Leicesteria*), with Descriptions of Two New Species. Part XXI. Descriptions of New Species of *Aedimorphus* and *Finlaya*, and Notes on *Stegomyia albolineata* (Theo.). Part XXII. The Indian Species of the Genus *Taeniorhynchus* (including *Mansonioides*), with a Description of One New Species.—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 523–532. With 1 plate [2 refs] ; 533–548. With 2 plates ; 549–554. With 4 text figs. [1 ref.] ; 555–563. With 2 plates.

BREINDL (V.) & JIROVEC (O.). Ueber einige Abnormitäten bei *Trypanosoma Lewisi.*—*Cent. f. Bakt.* I. Abt. Orig. 1927. Feb. 5. Vol. 101. No. 6-7. pp. 417–418. With 2 text figs.

BROCHER (Frank). A propos de la capture de larves d'anophèles par les utriculaires.—*Ann. Parasit. Humaine et Comparée.* 1927. Jan. 1. Vol. 5. No. 1. pp. 46–47. [1 ref.]

BRUG (S. L.). *Lophoscelomya annandalei* var. djajasanensis nov. var. (*Diptera, Culicidae*).—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 804–806. [3 refs.]

CHALAM (B. S.). Note on Some Points regarding Fertilisation and Development of the Ovum in Anopheles in Captivity.—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 775–777.

**Deschiens** (R.). *Chilomastix sp.* observé chez le chimpanzé (*Anthropopithecus troglodytes*) et chez le macaque (*Macacus sinicus*).—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 794–798. [2 refs.]

**Giglioli** (G. O. M.). Notes on Some Neo-Tropical Species of Tongue Worms. Human Porocephaliasis in Tropical America.—*Jl. Trop. Med. & Hyg.* 1927. Feb. 1. Vol. 30. No. 3 pp. 33–39. With 5 text figs. [23 refs.]

**Gioseffi** (M.). Mezzi efficaci ed economici per la distruzione delle larve di anofele: le gambusie e il verde di Parigi.—*Riforma Med.* 1926. Sept. 6. Vol. 42. No. 36. pp. 856–858. With 1 text fig. [10 refs.]

**Mühlens** (P.). Die Erfolge der Chemotherapie bei tropischen, namentlich Protozoenkrankheiten.—*Arch. f. Experim. Path. u. Pharm.* 1927. Jan. Vol. 119. No. 5–6. *Verhandlungen d. Deut. Pharm. Gesellsch.* pp. 28–32.

**Parrot** (L.). Comment recueillir les phlébotomes.—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 108–109.

**Pereira** (Jayme R.). Sobre a acção physiologica do veneno do sapo. II. Veneno de sapo (*Bufo marinus*) e secreção urinaria.—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 171–5. With 2 text figs. [6 refs.] French summary p. 176.

**Pérèkropoff** (G. I.). Sur la question des parasites du type Sergentella.—*Cent. f. Bakt.* I. Abt. Orig. 1927. Jan. 3. Vol. 101. No. 4–5. pp. 229–231. With 2 text figs. [v. this *Bulletin,* Vol. 23. No. 9. p. 706.]

**Taliaferro** (Lucy Graves). Periodicity of Reproduction, Infection and Resistance in Bird Malaria.—*Proc. Nat. Acad. Sci.* 1925. June. Vol. 11. No. 6. pp. 348–352. With 1 text fig.

## REVIEWS AND NOTICES.

CELLI (Angelo). Storia della Malaria nell'Agro Romano. Opera postuma con illustrazioni del Dott. P. Ambrogetti e una Carta Topografica. [**The History of Malaria in the Roman Campagna.**] —*Mem. R. Accad. Lincei,* Rome. (Cl. d. Sci. fis. mat. e nat.) Series 6. Vol. I. Fasc. III. pp. 73–467. 1925. [Issued in December.] With 10 plates, a curve, and a map. (Città di Castello: Soc. Anon. Tipogr. " Leonardo da Vinci.")

ANGELO CELLI, formerly Professor of Hygiene in the University of Rome, is already well known for his pioneer work (with MARCHIAFAVA) on the malarial parasites, and also as the author of a little classic on malaria (1899) and as the leader, for many years, of a vigorous anti-malarial campaign in his native land. But it is not, perhaps, generally known that during the latter years of his life he was engaged in making an exhaustive historical study of malaria in the Roman Campagna. At the time of his death—in 1914, at the age of 57—he had fortunately written up the greater part of his results; and his voluminous manuscript, with its copious commentary and annotations, has at length been published posthumously (with additions by other hands) in the work under review. For this valuable legacy we have to thank the devotion of his widow and of his friends and pupils. Prof. G. CALZA has carefully revised the text, with the expert assistance of Drs. CANEZZA and GENOVESI on the medical side, of Profs. TURCHI and PINCHERLE in historical matters, and of a qualified engineer—DE TUCCI—in problems connected with irrigation and sanitation: while the Royal Academy of the Lincei, by shouldering the responsibilities of publication, has placed all students of epidemiology in general, and of malaria in particular, under a lasting obligation.

The author's aim, as stated in his own introduction (p. 82), was to trace the whole history of malaria in Rome and the Roman Campagna from prehistoric times down to the present day—a formidable task, since, as he pithily remarks elsewhere (p. 247), even the most accurate *historians** have, in the past, paid little or no attention to the sanitary condition of the stage whereon the events which they chronicle have been enacted.

At first sight, indeed, the difficulties of such an undertaking appear insuperable: but the author's erudition and ingenuity will soon convince most readers that his project is not merely feasible, but that malaria in Rome is even, perhaps, the most favourable of all subjects for historico-epidemiological inquiry. For there are probably few diseases more clearly recognizable than malaria, even in the casual allusions of non-medical writers; and there is probably no region of the globe richer in historical records than Rome—the centre of Latin civilization, and the headquarters of the Roman Republic, the Roman Empire, and the Roman Church. It is clear, therefore, that—quite apart from the extant writings of numerous Latin and Italian historians, physicians, and naturalists—there must be vast untapped stores of data available to anybody possessed of the industry and knowledge necessary for their collection and collation.

Celli evidently had all the patience and scholarship requisite for this herculean labour. He has drawn his information from almost every conceivable source—from medical and scientific writers, from historians and archaeologists, from poets and novelists, from church records and papal bulls, from municipal regulations and parish registers and bills of mortality. He has ransacked the Latin and Italian classics, and has not neglected to read the tales of travellers and geographical gossips. Even local sayings, proverbs, lampoons, comic verses, and epitaphs, are occasionally made to give evidence. A large proportion of Celli's references, consequently, could only be verified by a person living in the Province of Rome, and familiar with local conditions, customs, history, and traditions.

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* Italics in the original.

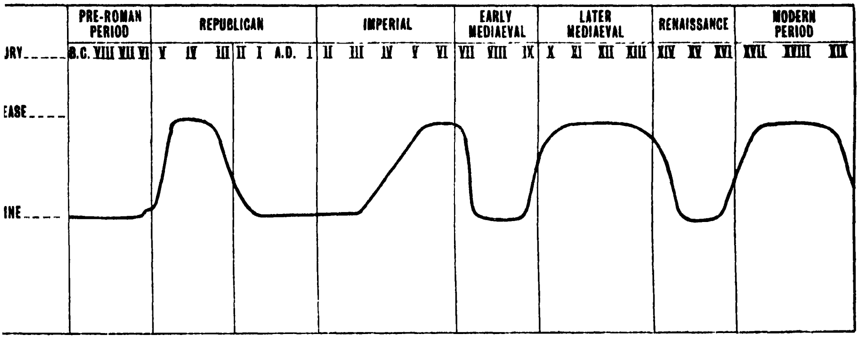
As all the sources indicated, with many others, have been utilized in preparing the present monograph, it will be clear that a detailed analysis of its matter is out of the question. Those interested must go to the original, whose contents can be but briefly described here.

The work is divided into three main parts, dealing respectively with the Period of Antiquity (prehistoric times and Ancient Rome, pp. 91–122); the Middle Ages (pp. 125–273); and the Modern Period (15th Century to the present day, pp. 277–455). The whole is prefaced by an admirable Introduction (pp. 79–87), delivered in a concise and aphoristic style, and concludes with a remarkable attempt at a bibliography of the subject (Malaria in Rome and the Campagna) from 1802 to 1870. Most of the works here cited—of which there are over a hundred—are probably unknown and inaccessible to the majority of English students.

Evidence relating to the prevalence of malaria during these three historical epochs has naturally been obtained from different sources. Consequently, uniformity of treatment and argument was not to be expected, and the author's conclusions are not all equally well founded. For the oldest period, for example, most of the information available is archaeological, and derived from such unpromising material as can be extracted from a study of ancient sites of settlement, or from consideration of the import of the curious system of "drains" which prehistoric engineers burrowed in the Roman hills. For the somewhat later period, the classical Latin writers are exhaustively drawn upon, and their words ingeniously, though critically, interpreted. It may be noted in passing that, in dealing with the period of antiquity, the author makes some interesting comments on the goddess "Fever" (*Dea febris*, referred to by PLINY and others), to whom the early Romans raised altars and made placatory offerings. He also makes it plain that he does not countenance a belief in the Carthaginian origin of Roman malaria (*contra* W. H. S. JONES). Malaria, he says (p. 110), arrived at the gates of the city long before HANNIBAL.

For the "modern" period much documentary and other evidence is, of course, available, and the author has utilized it to the full. But it seems, at first sight, hardly possible to study Roman malaria during the Middle Ages; and it is therefore particularly interesting to see how Celli has attempted to bridge the historic gap between ancient and modern times. He has done it chiefly by a highly ingenious consideration of church history and agriculture during this period. His guiding principles appear to be sound, and are akin to those of the uniformitarian geologists. Recent events in the Campagna supply a key to earlier times: the present is merely a continuation of the past. Dense population or intensive cultivation of a particular area is, at the present day, incompatible with the presence of severe malaria. Districts now flourish and are populous because they are not malarious; abandoned districts are deserted because malaria has made them uninhabitable: and what is now happening must have happened many times before. Again, there is much scattered evidence of repeated attempts at irrigation in various areas—attempts which almost invariably failed. Why? Similar enterprises in recent times furnish an answer. Then again monasteries, hospices, and hospitals, are not now built, and do not now decay, without cause. The presence of a church implies the existence of a congregation; and the abandonment, removal, or refoundation of a church reflects corresponding vicissitudes in the life of the attendant community. Inquiry into the causes of such changing events—of which abundant historical records remain—leads in many cases to the unavoidable conclusion that malaria has exercised a dominating influence in the history of the Campagna.

We cannot here follow the author through all the multifarious paths which lead up to his principal conclusion. This is not, indeed, set out formally and finally, but is iterated or implied, time and again, throughout the whole work, and graphically displayed in the form of a curve at the end. Expressed as briefly as possible, it is that ***malaria, like all other epidemic diseases, is a periodic phenomenon*** (p. 81, *et alibi*). It develops in waves, cycles, or rhythms, which recur with periodic frequency. The disease has, in the first place, a *daily* cycle—manifested as an intermittent periodic fever in the individual. Then it has a *monthly* cycle—certain types of malaria recurring regularly at definite seasons of the year (*e.g.* benign tertian in the spring, malignant in summer and autumn, quartan in autumn). Further, there is an *annual* cycle—a regular alternation of severe epidemics with mild outbreaks over a period of years. (According to Celli, statistics show that, since the middle of last century, the severe epidemics have recurred in the Campagna with approximately 10-yearly frequency, though intermediate 5-yearly fluctuations are also evident.) All these minor rhythms the author recognizes and accepts: his chief endeavour is to demonstrate that there has been, in addition, a grand cyclical development of malaria during the *centuries*—a rhythmical alternation of century-long periods when the disease was severe and devastating, with others when it was relatively mild and harmless. In earliest times (up to about 600 B.C.) malaria in the Campagna was mild. It became severe during the 5th, 4th, and 3rd centuries B.C., and then died down. It flared up again, however, during the 5th to 7th centuries A.D., which were followed by a return to the milder form once more. A severe period then recurred during the 10th to 13th centuries, after which the disease again became "attenuated"—only to blaze out anew in the 17th, 18th and 19th centuries. At the present time it is dying down—for the fourth time in its ascertainable history.



Graph of Decline and Increase in Malaria in the Roman Campagna throughout the centuries.

Whether or no the present waning of malaria in the Campagna is in any way due to hygienic efforts on the part of man, the author hesitated to affirm. He was fully alive to the fact that a similar decline in the power of the *Dea febris* had previously taken place more than once, without any evident human intervention to account for it. Moreover, he was not among those who believe that organized settlement and cultivation of the Campagna will ever, of themselves, succeed in stamping out malaria; for he well knew that such measures had already been repeatedly tried in vain. On the contrary, he was convinced that the area in question will never be habitable and cultivable unless malaria be first evicted. He knew the difficulties as few men can know them, but was nevertheless an optimist—believing that knowledge is power, and that Science can overcome all obstacles. Consequently, his dreary tale of past failures and grievous visitations did not depress him; but, inasmuch as it represents a substantial addition to human knowledge, it even inspired him with hopes for the future.

A word must be said, in conclusion, about the illustrations accompanying this remarkable work. In addition to an informative map of the area under discussion, there is a series of excellent photographs—by Dr. P. Ambrogetti, one of the author's trusted henchmen—showing actual scenes n the Campagna: while portraits of Cardinal DE LUGO (who, in the 17th century, was largely instrumental in introducing quinine into Italy) and of the celebrated physician LANCISI (who had already divined in 1717 the part played by the mosquito in the aetiology of malaria) serve to enrich a monograph which is in every way worthy of the great scientific and historic traditions of its country of origin.

Clifford Dobell.

MANSON-BAHR (Philip H.). [D.S.O., M.D., F.R.C.P.] & ALCOCK (A.) [C.I.E., LL.D., F.R.S., Lt-Col. I.M.S. (ret.), sometime Professor of Medical Zoology in the University of London at the London School of Tropical Medicine.]. **The Life and Work of Sir Patrick Manson.**—pp. ix + 273. With 12 half-tone plates. 1927. London, Toronto, Melbourne & Sydney: Cassell & Co., Ltd. [16s.]

Sir Patrick Manson was undoubtedly a great man and it is fitting that his biography should have been written by two authors well equipped for a duty which it is clear they have regarded as a labour of love. Colonel Alcock has brought to the task, not only reverence for Manson and his attainments, but that mastery of the English tongue for which he is distinguished and which lends distinction to all his more important literary work. Dr. Manson-Bahr writes with almost a filial piety and yet is careful to refrain from fulsome admiration, from inordinate praise. Both authors knew Manson well in his prime and in his later years and subscribe to what has been called the Mansonian tradition, that blending of laboratory and clinical work, that building on a biological basis, that spirit of inquiry, tempered by sound judgment, which characterized the methods of the master.

The result is on the whole an admirable book, well balanced, carefully written and in many ways illuminating. "On the whole" we say, for, unfortunately, Manson in his earlier years, those strenuous years in China, remains a somewhat shadowy figure. It could not well be otherwise, for he outlived nearly all his contemporaries and so the authors were unable, with one trifling exception, to get accounts of him first-hand what time he sojourned in Formosa, practised and laboured at research in Amoy and, at Hong Kong, continued to follow his profession, the while he laid the foundations of modern medical education in that outpost of Empire. There is nothing shadowy, however, in the account of Manson's work in these places and Alcock unfolds the tale of his trials and discoveries and triumphs with a discernment and sympathy which rivet the reader's attention and excite his warm interest in a remarkable story of endeavour.

Patrick Manson, a son of the Laird of Fingask and a Blaikie on his mother's side, was born in the parish of Oldmeldrum in Aberdeenshire on October 3rd, 1844, and, even as a child, betrayed an interest in natural history. Destined for the engineering profession, he developed a physical infirmity, the result of trying to do men's work while still immature, and as a result abandoned engineering for medicine. He entered the University of Aberdeen in 1860 and studied there and also to some extent at Edinburgh. He passed the final examination at Aberdeen before he was twenty, too young to graduate, and so proceeded to London, visiting schools, hospitals and museums, and thereby laying a sure foundation for what was to follow. After taking his M.B., C.M. in 1865 he served for some time as Assistant Medical Officer to the Durham Lunatic Asylum and, while so doing, made his first contribution to medical literature in the form of a paper which, as a thesis, gained for him the M.D. of his Alma Mater. His adventurous spirit presumably chafed at the limitations imposed by asylum work and so, in 1866, he fared foreign, having obtained the appointment of Medical Officer for Formosa to the Chinese Imperial Maritime Customs, a service at that time directed by the famous Sir Robert Hart. Manson was nearly 5 years in Formosa, but we hear little of his life there and learn only that he had plenty to do, was, as ever, observant and a careful note-taker and so prosperous that, at the age of 25, he was able to repay his father the £700 which had been spent on his medical education, an earnest of that fine independence of spirit and self-reliance which marked his future career.

In 1871 Manson moved to Amoy, which was to be his home for 13 years, and we are given an account of his varied activities, amongst them his prowess with the gun, for, throughout his life, he remained a keen sportsman, skilled with both rod and fowling-piece. The picture of Amoy is slight but the description given of Manson's human environment and the way he dealt with it is interesting. Surgery occupied much of his time and his success in dealing with elephantiasis of the scrotum and vesical stone served to establish his reputation and at the same time to line his pockets. Always a wise man, Manson took a leaf out of the book of the native Chinese practitioners and abolished the secrecy, or rather remoteness, which had been a feature of European practice, thereby gaining the confidence of the inhabitants His adventures in attempting post-mortem work in the face of difficulties and, indeed, dangers, his hospital experiences and his efforts at training students in western medicine, frustrated in large measure by a "hot-gospeller" of a missionary, provide material for a chapter which is followed by one that recounts more intimately his medical and surgical activities and incidentally reveals the vast field of experience to which he had access at Amoy. It was there he became familiar with liver abscess and, not content with existing surgical procedure, introduced his trocar and cannula, still used under certain conditions. It was there, with his microscope, he searched the "juice" from leprotic nodules and encountered, in the same year that HANSEN discovered them, the lepra bacilli, although he did not appreciate the significance of the rod-shaped bodies which he tried to cultivate. It was there he differentiated *Tinea imbricata* and first commenced the study of the blood in malaria, and it was there, in the midst of all his other work, oppressed by the cares of practice, far from skilled help and advice, that he made his great discovery and incriminated the mosquito as the intermediate host of the parasite of human filariasis.

Chapter IV tells the story, but it begins with his return to England in 1874, his marriage in 1875, his eye work at Moorfields and his pathetic quest in London for enlightment into the problems of tropical pathology. Like the dove from the Ark, Manson found no foothold, his solitary grain of comfort, so far as chyluria and elephantiasis were concerned, being the record of the observations of Timothy LEWIS, that godfather of tropical medicine, upon *Filaria sanguinis hominis* in Calcutta. This grain of comfort became also, as Alcock puts it, a grain of mustard seed which he carried back with him to Amoy, where "it grew into one of the greatest amongst herbs for the service of men whose pabulum is Tropical Medicine."

A brief but adequate and accurate account of the history of filaria is followed by an exposition of Manson's work on the subject—work characterized by openness, breadth and unpretentiousness, as the biographer puts it. How interesting is it to read that Manson made some of his observations on the filaria of the white-necked crow when only the other day WAIL, POPOW and PRJADKO of Moscow recorded their investigations on the filariasis of crows and expressed the hope that their observations would indicate the importance of a more exhaustive study of the pathological manifestations of human filariasis. The tale of the solving of the chief part of the filariasis puzzle has often been told, but never better nor more fully than in this book. A letter from Manson to COBBOLD is forthcoming as is one from LEWIS to Manson. The latter's careful reasoning, intuition, patience, dogged perseverance and mistakes are all revealed to us and so are the indifference and hostility with which his discovery was received by part of the scientific world. The full significance of his findings, the momentous nature of his revelations are here made apparent, but so are the shortcomings in his work, for Manson throughout clung to his idea that the filarial larvae were imbibed in drinking-water after escaping from the drowned mosquito. It was not, indeed, until 1900 that Low set the seal to Manson's early work by adducing proof that the filaria entered the blood of man from the mosquito's proboscis. In this connexion the wording in the book on page 59 is, perhaps, a little unfortunate, as it might possibly be held to question the priority of Low's work which, so far as the reviewer knows, has never been in doubt. It therefore seems advisable to quote from an annotation which appeared in the *British Medical Journal* for May 6th, 1900, and which runs as follows :—

> " By a happy stroke of the sectioning knife passing through the entire length of the proboscis of a filariated mosquito Dr. E. (*sic*) C. Low, who has been working under Dr. Manson for some time at the London School of Tropical Medicine, has been able to bring strong evidence to prove that the filaria leaves the mosquito by way of the proboscis. In the section referred to the parasite can be seen coiled up in the head of the mosquito, lying under the cerebral ganglia and stretching along the entire length of the proboscis. The preparation seems to show that the filaria is communicated to man by the bite of the mosquito. This important discovery not only revolutionises our ideas as to the precise way in which the mosquito conveys the filaria to man, but by analogy lends support to the truth of Ross's inoculation theory of malaria."

In any case, if Low was first in this field, S. P. JAMES, whose observations are mentioned, and whose letter on the subject to Manson is transcribed, was a very good second.

We are so apt to think of Manson in terms of filaria and malaria that information on the amount of miscellaneous scientific work he accomplished in Amoy, some of it distinctly important, comes as a surprise. Yet it but serves to emphasize his keen spirit of inquiry, that constant mental alertness so exceptional in such a place of residence.

Hong Kong, whither he migrated when close upon 40, provided him with a wider field and also enlarged the scope of his energies, converting him into the best type of publicist. It is true that preventive medicine did not specially appeal to him—he once said to the present reviewer, " Don't talk to me about water-closets "—his mind being set chiefly on the causation of disease and on the biological problems connected with its etiology ; yet, for all that, he played a leading part in the establishment of a Dairy Farm run on hygienic lines and which still exists as a flourishing business concern. His greatest work in Hong Kong, however, was his contribution to the cause of medical education, and one of the finest things in his biography is the speech he made at the opening of the College of Medicine for Chinese, a statesmanlike utterance revealing his breadth of mind and wideness of outlook, as well as a negation of self altogether admirable.

The scene shifts to London, and we get a more intimate picture of him than heretofore and mark how, slowly but surely, he made his way and how the same characteristics which had spelled success in China enabled him, in the face of opposition and even ridicule—he was dubbed " Mosquito Manson "—to establish himself firmly in the Metropolis and to attain some at least of his ideals. Amongst them was the foundation of the London School of Tropical Medicine, thanks in the first instance to his close and most profitable association with the Seamen's Hospital Society and in the second to the support accorded him by Joseph CHAMBERLAIN.

His life in London was a very full and interesting one, joyous also, though for a time clouded and saddened by the death of his eldest son. Manson, however, was not a man to repine. For one thing he was always much too busy, for another he had varied interests, for yet another he had an urbane and patient disposition which never fretted unduly against the bludgeonings of fate. He soon made a reputation as a teacher of clinical medicine, and the reason is not far to seek when one reads his graphic description of the life-history of the guinea-worm. Manson in his speech was often pithy. At times he could be both pithy and pungent. A very considerable section of the book is devoted to the Mosquito-Malaria Theory, which is enunciated in a painstaking and critical fashion and vividly supplemented by the remarkable series of letters which Manson addressed to Ross, the man of his choice, when the latter was toiling laboriously in India for the proof which was so hard to find. These letters, linked here and there by text, tell a graphic tale and throw fresh light on the relations between the two men which Mr. Neville CHAMBERLAIN likened the other day to those existing between DARWIN and WALLACE. A mere review cannot do justice to the story; but it may be said that the part played by Manson is well defined, the part played by Ross frankly and fully acknowledged, and the greatness of their joint achievement duly emphasized. At the same time, there would seem to be a tendency here, as also in the filariasis account, not indeed to conceal Manson's limitations, but to find excuses for them. It is very natural, and there is much truth in what is said, but Manson was big enough to make mistakes without any necessity for explanation, and it might, perhaps, have been better to state them and to let them stand. It will always be a matter of surprise that Manson's imagination and reasoning powers did not lead him, sooner or later, to the real method whereby the mosquito infects man either with the filaria or the malaria parasite. The biggest and best brains may be the victims of a preconceived notion or obsession. The chapter on " Further Contributions to Science " gives a good idea of Manson's wide range and recalls how much we owe to him, especially in the helminthological field. That on the London School of Tropical Medicine is a trifle disappointing in that very little is said about the band of pioneers that Manson gathered about him and who aided him in his enterprise. CANTLIE, SIMPSON, DUNCAN, Oswald BAKER, HEWLETT, SAMBON, REES, DANIELS, LOW and, at a later date, SANDWITH, we would have liked to hear a little more about them when the School was in the making and about their relations to the Chief. Some, it is true, are mentioned, but a picture of the early days and the group that used to gather on the station platform at Connaught Road would have added interest to the account given and would in no way have detracted from the central figure.

Some exception must be taken to the statement made in connexion with the position of tropical medicine at the time the School was founded. It is to this effect : " As to tropical disease, books of an inferior order, based mainly on hearsay, very little on actual experiment, had been written on the subject, but they were few and their readers limited in numbers." Such a criticism is unjust to the pioneers in tropical medicine. Or ever Manson wrote his famous manual there existed a large literature on tropical diseases and some of the treatises were of a very high order. One need only cite an important and comprehensive work like MARTIN's " Influence of Tropical Climates on European Constitutions," the lineal descendant of JOHNSON's earlier tome, DAVIDSON's " Hygiene and Diseases of Warm Climates," to which Manson himself contributed and, more especially, perhaps, that wise " Commentary of the Diseases of India " by Norman CHEVERS, embodying the ripe experience of a great clinician to which Manson was indebted for some of his own knowledge. It is of course true that these books had the limitations belonging to the period when they were written, but it is worth remembering, and it in no way belittles Manson, that he was not, as stated in this biography, the " Father of Tropical Medicine," but the " Father of *Modern* Tropical Medicine," and this is the title which Raphael BLANCHARD so fittingly bestowed upon him.

The concluding portion of the book is written with sympathy and insight. In " The Closing Scenes " we see him an old man full of years and honours, crippled by the gout, his life-long enemy, but still enthusiastic and thorough, whether he was dealing with the affairs of his beloved School or casting for trout on Lough Mask or on his native Donside. Even at the end his thoughts were concerned with the advance of research work and the future of his School and he was writing about the latter and also about a Manson Scholarship which he wished to found when the call came and he rested from his labours. The last chapter is called " Manson's Philosophy of Life," and tells us a good deal about his personality and his sane outlook on men and things. It is illuminated here and there by a story, a saying or a letter and anyone who reads it will agree with its writer that Manson belonged to the company of those who " warmed both hands before the fire of life."

The book is what it purports to be, an account of Manson's life and work, and it is a good account, written with care and discretion. Considering that it is by no means easy to compress the events of such a long and active and memorable career into some 240 pages, it is wonderfully complete and it appears to be an accurate and fair presentation while, as has been said, it reflects credit on its authors in virtue of its well regulated enthusiasm and the clarity of its exposition. Yet it lacks something, and that something would seem to be the impressionist touch which marks the highest art of the biographer and which alone can make the dead man live. In one place, and in one place only, do we get a wholly satisfying word etching of the Manson we knew and followed, and that is from the pen of HANSCHELL. In two pages he brings back to memory the benign and impressive figure, the kindly yet serious clinician to whose weighty words his students listened with a stillness which testified to their value. Yet it would be ungracious and unfair to find fault in any way with the fine tribute the joint authors have paid to Manson's memory because this rare and elusive gift is not in evidence. They have given of their best and have produced, not only a sound and interesting book, but a fitting testimony in text and illustration to one who did much for Science and even more for humanity.

Andrew Balfour.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

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## MEDICAL ZOOLOGY.

PATTON (W. S.). **Blood-Sucking Arthropods of Medical and Veterinary Importance in China.**—*China Med. Jl.* 1926. June & July. Vol. 40. Nos. 6 & 7. pp 543–553; 603-612.

The title of this paper is somewhat misleading. The paper is not a monograph of the species of blood-sucking arthropoda proper to China, but is a compendium or syllabus of the elements of medical zoology, published with the praiseworthy object of assisting medical men and zoologists in China to observe and collect intelligently and purposefully.

A. Alcock.

FELT (E. P.). **[Report of] State Entomologist [for 1924].**—*New York State Mus. Bull.* Albany, New York. 1925. June. No. 260. pp. 46–54. [Summarized in *Rev. Applied Entom.* 1926. Dec. Vol. 14. Ser. B. Pt. 12. p. 209.]

Here the following memorabilia are to be found :—

Young maggots of *Wohlfartia vigil* removed from a man's conjunctiva. Larva of *Attagenus piceus* (black carpet-beetle; Dermestidae) in one case vomited, in other case removed from the vagina. Larva of *Tineola bisselliella* (a clothes moth) removed from urethra. Houses haunted by bats may also be infested by the bat-Cimex (*C. pilosellus*), which is often mistaken for the much more obnoxious bed-bug. Both bats and bugs in buildings can be destroyed with calcium cyanide.

A. A.

WILLIAMSON (K. B.). **Mosquito Researches.**—*Malayan Med. Jl.* 1926. Dec. Vol. 1. No. 4. pp. 21-27.

Although a good deal of the information contained in this valuable report is of only local importance it contains numerous items of general interest, particularly in its experimental investigation of the surmise first expressed by Sir Malcolm WATSON that the fitness of a potential breeding-place for Anopheles is determined by the composition of the water. One of the most general conclusions is that " all* observations point to the almost complete cessation of anopheline breeding [in growing rice fields] when the acidity of the water falls to pH6, and a sharp decrease below pH 6·4," although it is emphasized that on one occasion larvae of rice-field species were found in abundance in a drain (between rice-fields) where the water varied from pH 5·3 to 5·6. Another general conclusion from comparisons between certain dissimilar waters sterile to Anopheles *in situ* and the same waters made fertile to Anopheles in the laboratory, is that the natural sterility of waters may be due to their deficiency in food-stuff. These experiments were made by introducing small floating cages of bamboo and muslin into the natural waters that were free from Anopheles breeding, the cages containing some of them well-grown Anopheles larvae and some of them Anopheles eggs, in measured numbers ; the results of the observations are compared with the results of laboratory experiments where larvae and eggs were placed in water from the same natural sources in some cases without food, in other cases with a suitable supply of food. The results of the ingenious experiments here described justify the conclusion—probably of general import, but at least for the particular waters examined and the particular species of Anopheles made use of for experiment—that the food-factor is the determining one.

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* From the passage quoted it might be thought that diminution of *acidity* is accompanied by diminished breeding. What is meant is that a fall of the pH figure (i.e., *increased* acidity) is accompanied by lessened breeding. Early in the paper the author speaks of " the acidity (pH) " ; acidity and pH are not, however, interchangeable terms. As acidity rises, the pH figure falls and *vice versa*. The confusion arises from the wrong use of the symbol pH as synonymous with hydrogen ion concentration and so with acidity. The symbol pH stands for the logarithm of the *reciprocal* of the H. ion concentration and so rises and falls inversely with acidity. A useful article on hydrogen ion concentration and pH was published in the *Bulletin of Hygiene*, Vol. 1, p. 247–8.—Eds.

Experiments and observations are recorded respecting the larvicidal powers of common aquatic (paddy-field) bugs and of common paddy-field fishes. Among bugs the Belostomidae were found most efficient. Among fishes an Ophiocephalus, the species of which are not usually credited with eating anopheline larvae, were voracious enough in the laboratory, though not equal to the well known Osphromenus.

The flora associated with areas in Perak where the amount of Anopheles breeding is known receives notice. The presence of a Utricularia (*U. flexuosa*) " appears to characterize either the limitation of anopheline species to *A. sinensis* and *barbirostris* or the complete, or nearly complete, absence of all anopheline breeding."

The larvicidal properties of roasted *amang*—a ferruginous residue from a local mine—are described as sufficient to justify its practical probation. Rubber oil is also noticed as an efficacious larvicide, either alone or as an adjuvant to other oils.

The statement is made that algae form only a small portion of the food of Anopheles larvae, the bulk of their food being " of an amorphous character and of obscure origin " ; [but this generalization must depend on very much limited observation—perhaps on observations of larvae from rice-fields at some particular time].

A. A.

HAROLD (C. H. H.). **Studies in Mosquito Bionomics.**—*Jl. Roy. Army Med. Corps.* 1926. Aug. & Sept. Vol. 47. Nos. 2 & 3. pp. 81–94 ; 180–187. [11 refs.]

Among the contents of these discursive notes is a discussion on the influence of the pH of the water upon mosquito larvae ; from the author's observations and experiments one gathers support for the commonsense view that the food-supply is the determining factor in rapid and healthy growth in nature. Another matter discussed is the value of cresol as a larvicide. The author points out that since crude cresol is not a definite chemical compound, and commercial cresols contain other coal-tar derivatives, as well as excipients, a trade " cresol" may be a good germicide and disinfectant without being also a good larvicide. It is of general interest to note certain circumstances observed by him to influence the larvicidal efficacy of a given " cresol " and the interpretation of its larvicidal effects. Larvicidal efficiency is increased at high temperatures of the medium, also by increased acidity (but only by addition of acid much in excess of anything to be met with in natural waters), also by addition of NaCl; but it appears to be diminished, or retarded by the presence of silt in the medium, and by stabilizing ingredients other than soap in the cresol. Furthermore, larvae may become more or less habituated to cresol in non-lethal dilutions, and they may recover completely after lengthy immersion in a dilution of which the immediate effect has appeared to be fatal, particularly if when apparently dead they are removed to clean water. Another important note is that Anopheles larvae are very much less susceptible than Culex larvae to cresol of the same quality, a phenomenon which the author attributes to their resting position at the surface of the water where they get unpoisoned air. For the same reason pupae are tolerant of cresol.

A. A.

EDWARDS (F. W.). **Mosquito Notes.—VI.**—*Bull. Entom. Res.* 1926. Oct. Vol. 17. Pt. 2. pp. 101–131. With 11 text figs.

There are eight fascicles of these Notes, dealing respectively with (1) the races of *Aëdes variegatus*; (2) the species of the *kochi* group of the Aëdes subgenus *Finlaya*; (3) new species of *Culex* from the Australasian islands; (4) additional records of Culicini from the Solomon islands; (5) a collection of culicines and aedines from Tasmania and S.E. Australia; (6) some culicine larvae and some specific records from Singapore; (7) some specific records from Katanga, Belgian Congo, including the remarkable *Anopheles implexus*, the pupa and the characteristic structures of the adult and larva of which are figured; and (8) the culicine fauna of Nairobi.

A. A.

SEVERN (A. G. Millott). **The Mosquitoes of Hongkong.**—*Caduceus.* Hongkong. 1926. May. Vol. 5. No. 1. pp. 5–9.

The author notices previous surveys of the mosquitoes of Hongkong —by Dr. J. C. THOMSON in 1900–01, and by Dr. H. MACFARLANE in 1912–14. His own survey was made in 1925 and the specific identifications have been done by EDWARDS of the British Museum; his list includes 4 species of Anopheles (against 8 species contained in MACFARLANE'S collections, which also were identified by EDWARDS) and 21 of Aedines and Culicines. In the author's experience the Anopheles of most frequent occurrence are *A. maculatus*, *A. sinensis* (also called *hyrcanus*), and *A. minimus*; they seem to be commoner in the winter months, probably owing to the damming in those dry months of streams that in the rainy season are too turbulent for mosquito-breeding. The commonest of all mosquitoes, and persistent through all seasons, is *Culex fatigans*. *Stegomyia fasciata* (*Aëdes aegypti* or *argenteus*) was found only once in the course of more than a year by the author, who notes also that this species is not included in THOMSON'S list of 1900–01.

A. A.

BOREL (M.). Note préliminaire sur les moustiques de Cochinchine et du Sud Annam (Massif du Langbian). [**Mosquitoes of Cochin China and South Annam.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 472–479. [2 refs.]

As a result of systematic collection during the year 1925 the author gives a list of 45 species of mosquitoes, of which 10 are Anopheles, studied by him in Cochin China and South Annam. All appear to be species well known in the Oriental Region. Particulars are given of haunts, habits, places of capture, etc., of adults and larvae. It is stated that *Stegomyia fasciata* is not rare in Indo China and that its eggs have never been found by the author in any natural waters. *Armigeres obturbans* is the only species in the list that is not found all the year round ; it occurs only in the dry season and beginning of the rainy season.

A. A.

YAMADA (Shinichiro). **A Revision of the Adult Anopheline Mosquitoes of Japan : Systematic Descriptions, their Habits and their Relations to Human Diseases, together with an Account of Three New Species.**—*Scientific Reports from Govt. Inst. for Infectious Diseases.* Tokyo. 1924–25. Vols. 3 & 4. pp. 215–241 ; 447–493.

This is a systematic account of the Anopheles of Japan of which 14 species are known. It appears to be a very thorough piece of work ; in every instance a full description of male and female is preceded by a critical list of synonyms and is followed by notes or distribution, habits, relation to disease and frequently also by historical remarks. As the title indicates, only the adult forms are included.

A. A.

BRUG (S. L.). **The Geographical Distribution of Mosquitoes in the Malayan Archipelago.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 471–482. With 1 map.

This is a zoogeographical paper. The Macassar Strait (between Borneo and Celebes) and a line in its continuation between Bali and Lombok was determined by WALLACE as the north-western boundary of the Australasian Region. Observers since WALLACE have found that " Wallace's Line " is not so sharply defined as WALLACE at first supposed. The present author's study of the distribution of mosquitoes confirms these later observers. He finds that the mosquitoes of the Celebes, Moluccas, and Western Sunda Archipelago—all lying on the Australian side of Wallace's Line—are mostly Oriental, though Australian species occur in those islands, and in increasing numbers as one proceeds eastwards from the Line.

A. A.

RODENWALDT (Ernst). Entomologische notities IV [**Entomological Notes IV.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 6. pp. 787–799. With 3 text figs.

In Sumbawa Is., coincident with the formation of brackish fishponds, and at Bencoolen (Sumatra) where, owing to drought, small streams that should drain into the sea have formed brackish pools among the sand dunes, *Myzomyia ludlowi* has appeared and, in its wake, malaria; both have been controlled. The freshwater variety of this mosquito has been found in Sumatra at a height of 650 and 900 m. *M. barbirostris* here hitherto considered as a "wild," rather harmless species, is found haunting human habitations in the isle of Soemba. *N. maculatus* in Java (Preanger) is found only in rubber plantations with little shade; since the plantations were begun malaria has become very prevalent. *S. aitkenii var. palmata* (Java: Preanger) is described as a new larval variety; it has the large brown abdominal scuta hitherto peculiar to *M. aconita*, and the inner shoulder-hair in the very unusual form of a fan with narrow leaves.

N. H. Swellengrebel.

ROOT (Francis Metcalf). **Studies on Brazilian Mosquitoes. I. The Anophelines of the** *Nyssorhynchus* **Group.**—*Amer. Jl. Hyg.* 1926. Sept. Vol. 6. No. 5. pp. 684–717. With 1 text fig. & 9 plates. [17 refs.]

This paper deals with certain Tropical American species of Anopheles which most authors hitherto have assigned to the "Cellia" group, though, according to the views of CHRISTOPHERS, they belong to the "Nyssorhynchus" group; and it treats with very full detail those of the said species that have the last three tarsal segments of the hind-legs entirely, or almost entirely, white. Most authors outside Brazil recognize only three species in this kind, namely "*Cellia*" *argyrotarsis* with the said segments entirely white, and "*Cellia*" *albimanus* and *tarsimaculatus* having a black band on the last of the said white segments. The author has carefully studied the Anopheles of this description on the spot and in the field, and has examined eggs and larvae and pupae of some of them, and he describes and discusses here the results of his studies. In the result he recognizes 7 distinct species and 1 distinct variety among them. All this is exclusive of three other reputed species that CHRISTOPHERS has provisionally placed among local races of *tarsimaculatus*, which the author has not yet studied.

A. A.

CAMPOS (F.). [Estudios biológicos sobre los mosquitos de Guayaquil y alrededores.] [**Biological Studies of the Mosquitoes of and around Guayaquil.**]—*Rev. Col. Nac. Vicente Rocafuerte.* Guayaquil. 1925. Sept.–Dec. Vol. 7. No. 21–22. pp. 3–49. With 8 plates. [Summarized in *Rev. Applied Entom.* 1926. Aug. Vol. 14. Ser. B. Pt. 8. p. 152.]

In a year's survey around Guayaquil in Ecuador 32 species of mosquitoes were observed, among them *Stegomyia fasciata*, the familiar biology and bionomy of which are described, and 5 species of Anopheles, to wit, *tarsimaculatus* (which includes holes in trees among its other impartial breeding-places), *pseudopunctipennis* (appearing in December and January), *punctimacula* (a bush species, uncommon, breeding in stagnant waters, and occurring in June and July), *mediopunctatus* (another uncommon bush species, and possibly identical with *punctimacula*), and *hylephilus* (which breeds in Bromeliaceae and is rare).

A. A.

FALLERONI (Domenico). Fauna anofelica italiana e suo "habitat" (paludi, risaie, canali). Metodi di lotta contro la malaria. [**Anopheline Fauna of Italy and its Habitat (Marshes, Ricefields, Ditches). Control Methods of Malaria.**]—*Riv. di Malariologia.* 1926. Sept.–Dec. Vol. 5. No. 5–6. pp. 553–593. With 6 figs. on 1 plate. [Refs. in footnotes.] [English summary p. 738.]

This paper, which relates to malaria-carrying mosquitoes and the control of malaria in marshes and rice-fields in certain districts of Italy, does not contain anything new. According to the "English summary" the author's conclusion is that an increase in the number of domestic animals in well-adapted and well-placed "stables" must be the principal prophylactic measure against malaria, in such districts.

A. A.

LA FACE (Lidia). Revisione degli Anofelini Italiani. Nota IIa. Osservazioni sugli Anofelini del Ferrarese. [**Revision of Italian Anophelini. II Note. Observations on Anophelini about Ferrara.**] —*Riv. di Malariologia.* 1926. July–Aug. Vol. 5. No. 4. pp. 381–391. [7 refs.] [English summary pp. 551–552.]

The author is satisfied that *Anopheles elutus* is a species distinct from *maculipennis*. She has bred, in her laboratory, from hundreds of females identified with *elutus* and laying eggs without floats, individuals of a second generation corresponding with *elutus*. She has also noticed a distinct prevalence of *elutus* in malarious districts during the summer, and, on the other hand, a predominance of *maculipennis* in districts where malaria is scarce. She calls attention to the abundance of *elutus* in dwellings. She suspects that *elutus* "can adapt themselves to a certain degree of salt" in their breeding-grounds.

A. A.

SCHINGAREW (N.). La revision des anophèles de Russie. [**Revision of Anopheles of Russia.**]—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 896–899.

The total number of species and varieties of Anopheles appertaining to the fauna of Russia [including Turkestan and S. Caucasia] is here said to be 16. Among these is here meagrely described a "new species" (*A. martinius*) from Turkestan, and new varieties of, respectively, *A. algeriensis*, *A. hyrcanus*, and *A. superpictus*. *A. elutus* Edw. [doubtfully distinct from *A. maculipennis*] is here said to be the same thing as *A. saccharovi* described by FAWR in 1903.

A. A.

DUNN (Lawrence H.). **Mosquitos bred from Dry Material taken from Holes in Trees.**—*Bull. Entom. Res.* 1926. Oct. Vol. 17. Pt. 2. pp. 183–187.

Report of an interesting survey of the rot-holes and hollows of trees, made at Lagos during the dry season, with the object of investigating their potential importance as crèches for eggs, and prospective nurseries for larvae of mosquitoes. Material was taken from 114 holes in 100 trees—mango, breadfruit, banyan, bitter kola (Garcinia), and two trees not identified. Only holes that were perfectly dry were taken notice of, and the material collected included not only leaves and loose débris, but also scrapings from the sides and bottom of the holes. When the collections were transferred, severally, to small dishes of water in the laboratory, mosquitoes were bred from the material from 40 holes, to wit 8 species of Aedes—namely, ***Ae. luteocephala, wellmani, africanus, apicoannulatus, apicoargentea, aegypti, simpsoni,*** and ***longipalpis***—notwithstanding that the original holes had harboured an abundant and voracious fauna.

As the holes when examined were perfectly dry, and since no rain fell during the 61 days of the continuous survey, the author feels justified in concluding that the eggs of the species named are resistant to drought and remain viable [as is known to be the case with *Ae. aegypti*] through the whole of the dry season till the ensuing rains.

All samples of material were collected by, or in the presence of the author, and all precautions were taken to ensure exactitude of individual observations throughout. *Aedes aegypti* (*Stegomyia fasciata*) was bred in one instance from a tree standing about 125 yards from the nearest habitation.

A. A.

KOIDZUMI (M.). **Eight Years' Observation of the Seasonal Prevalence of *Anopheles sinensis* W. in Formosa, with some Remarks on the Influence of Climatic Conditions and on the Habits of the Mosquitoes.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. July. No. 256. English summary pp. 1–4. [In Japanese.]

Since the year 1913 the author has made daily collections of mosquitoes at Taihoku (in Formosa) where he finds the genus *Anopheles* to be represented by three species—***sinensis, minimus,*** and ***tessellatus.*** In the case of ***sinensis*** he has observed a distinct seasonal distribution. It has two main periodic swarmings, one at the beginning of the hot weather (last 10 days of April and first 10 days of May), the other at the end of the hot weather (last 10 days of September and first 10 days of October), and a less conspicuous swarming 60 or 70 days after each main swarming. Formosa is a notorious nursery of typhoons, and the author's experience is that typhoons stimulate rather than discourage the production of mosquitoes.

A. A.

CHALAM (B. S.). **The Breeding of Anopheles in Sea-Water and at a Short Distance from the Shore.**—*Indian Med. Gaz.* 1926. Aug. Vol. 61. No. 8. pp. 375–376. [1 ref.]

The author has found *Anopheles* ***subpictus, stephensi, culicifacies,*** and ***vagus*** breeding freely in pools of seawater in that part of the Bombay town littoral known as Back Bay. He notes [what is well known] that mosquito larvae are not at all likely to be found in pools that are flushed daily by the tides, but adapt themselves only to such pools as are filled periodically at high water spring tide—pools where, as a result of evaporation during the intervals between spring-tides, the sea-water may become actually briny.

A. A.

HOFFMAN (W. A.). **Resting Position of Haitian Anopheles.**—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 377–379. With 4 figs. on 1 pl. [3 refs.]

The author states of the two Haitian species of Anopheles that they can be distinguished by their resting attitude ; in *A. albimanus* the body projects at the usual anopheline angle, while in *A. grabhamii* it sticks out almost at a right angle.

A. A.

FALLERONI (Domenico). Note sulla biologia dell' "*Anopheles maculipennis.*" [**Notes on Biology of** "*Anopheles maculipennis.*"]—*Riv. di Malariologia.* 1926. July–Aug. Vol. 5. No. 4. pp. 353–380. [14 refs.] [English summary p. 551.]

It is noted that when an Anopheles sucks living blood the blood usually passes straight to the stomach, but that when other liquids are imbibed they pass at first into the crop ; the former process is here distinguished as "puncture," the latter as "simple aspiration." It is also noted that the nutritional and reproductive activities of *A. maculipennis* are modulated, but are not in abeyance, during the winter; also that malariated individuals of this species may be found in winter. [None of these observations is new.]

A. A.

BEKLEMISHEV (V.) & MITROFANOVA (Yu). [**On the Ecology of the Larvae of** *Anopheles maculipennis*, **Meig.: the Problem of Distribution.**] [In Russian.]—*Bull. Inst. Recherches Biol. & Sta. Biol. Univ.* Perm. 1926. May 18. Vol. 4. Pt. 7. pp. 285–332. With 2 figs. [35 refs.] English summary pp. 332–337. [Summarized in *Rev. Applied Entom.* 1926. July. Vol. 14. Ser. B. Pt. 7. pp. 130–131.]

The optima for larvae of *Anopheles maculipennis* are said to be calm shallow neutral or alkaline waters super-saturated with O, rich in submerged flora (and fauna), and exposed to direct sunlight. Young larvae in the laboratory were observed to remain alive for a time in water of pH below 7, and poor in oxygen, and also to withstand lack of atmospheric air better than older larvae ; at no stage, and not even in running water saturated with O (temperature 15°–30° C.) could larvae endure being cut off entirely from the O of the atmosphere. Young larvae are said to live entirely on vegetable, older larvae chiefly on animal matter. The influences both of dissolved O and of pH are considered to be indirect—on food-supply. It is stated that eggs of Anopheles are seldom, if ever, found in nature in waters in which larvae cannot grow to maturity. If this be a general truth of Nature then, it is argued, the additional fact that Anopheles hampered by laboratory conditions lay eggs that hatch and give issue to larvae that may survive for a time under laboratory restrictions supports the conclusion that the mother Anopheles in nature chooses her breeding places by unfailing instinct.

A. A.

ROUKHADZÉ (N.). L'hibernation des anophèles et des stegomyia en Abasie (Géorgie maritime). [**Hibernation of Anopheles and Stegomyia in Georgia.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 480–487. [7 refs.]

There is nothing at all new or strange in this paper, the author observing that (in Georgia) *Anopheles maculipennis* hibernates in the fertilized female stage, *A. bifurcatus* in the larva stage, and *Stegomyia fasciata* and *scutellaris* in the egg stage.

A. A.

BOREL (M.). Au sujet de l'action empêchante de la couleur blanche sur la ponte des moustiques, dans les jarres indigènes blanchies à la chaux. [**The Whitening of Native Pots a Deterrent to Mosquito Breeding.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. p. 702. [1 ref.]

The author refers to his former paper (see this *Bulletin,* Vol. 23, p. 708) describing the inhibitive effect of lime-washed water-barrels upon the breeding of house mosquitoes. He now once more emphasizes the fact that it is the uniform whiteness of the interior and exterior of the barrel that scares the broody mosquitoes, and not any imagined property of the whiting itself upon mosquito larvae, that is the essential principle. Therefore it is quite obvious that the domestic water-butt must be *kept white.*

A. A.

PRADO (Alcides). Especie de anophelineo raremente encontrado no estado de S. Paulo. [**Species of Anopheles rarely met with in S. Paulo State.**]—*Ann. Paulist. Med. e Cirurg.* 1926. Aug. Vol. 14. No. 8. pp. 90–93. With 2 text figs. [3 refs.]

This is merely a note on the occurrence of *Anopheles tibiamaculatus* in the district of S. Paulo, and a brief redescription of the species.

BOREL (M.). Note sur les gîtes de *Neocellia maculata* en Cochinchine et dans le Sud-Annam. [**The Breeding Sites of** *A. maculatus* **in Cochin China and S. Annam.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 703–704.

The author states that in two plantations he has found abundance of larvae of *Anopheles maculatus* in water-courses fringed with herbage (herbes abondantes, mais de peu de hauteur).

JATZENKO (Th.). Ueber die Auswahl der Winterungsräume von Malariamücken *Anopheles maculipennis* Meig. in der Ukraina. [**On the Choice of Winter Quarters by** *Anopheles maculipennis* **in the Ukraine.**] —*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 4. German summary p. 334. [In Russian pp. 277–278.]

Observations continued throughout the winter have satisfied the author that in the Ukraine *Anopheles maculipennis* chooses for hibernation quiet spots and dark surfaces in damp, warm, dark rooms.

FERMI (Claudio). Note di anofelinologia. [**Notes on Anophelinae.**]—*Riv. di Malariologia.* Rome. 1926. Mar.–Apr. & May–June. Vol. 5. Nos. 2 & 3. pp. 113–131; 286–302. [42 refs.] [English summary p. 250; 350–351.]

There is nothing new or suggestive in these Notes which seem to be referable to the particular Palaearctic species *Anopheles maculipennis.*

A. A.

PATTON (W. S.) & HINDLE (Edward). **Reports from the Royal Society's Kala Azar Commission in China. Notes on the Species of Sandflies (Genus *Phlebotomus*) of North China.**—*Proc. Roy. Soc.* 1926. Dec. 10. Vol. 100. Ser. B. No. B 705. pp. 405–412. With 7 text figs. [7 refs.]

The Commission has not yet had opportunity for an intent survey of Phlebotomus in N. China, but up to the present is aware of 3 species, namely, *P. major* var. *chinensis*, NEWSTEAD'S variety of *P. sergenti*, and a new variety of *P. perturbans*. The first, in females of which YOUNG and HERTIG found the parasite of Chinese kala azar to develop with frequency, is widely distributed in N. China, is a very common pest in Peking at the end of May and in June, and is thought to have but a single brood. The second, in females of which YOUNG and HERTIG found flagellates, is said to be common in Peking and Hsüchowfu from mid-June to September, and is believed to have two or more broods. The third was observed by Patton to be common in certain places during July and August and in one place appeared to be biting man. All three forms are described here.

The Commission did not have much difficulty in managing the transport of *P. argentipes* from Calcutta to China. From eggs and larvae shipped at Calcutta at the end (30th) of July, and kept at sea in an ordinary cabin, a batch of adults duly issued, and these, fed at sea, duly gave issue to eggs (laid on moist plaster of Paris). The eggs had perforce to be left unattended for 3 or 4 days at Hongkong, and the young larvae that were beginning to hatch from them had, in their turn, to be left without any attention during the land journey from Shanghai to Tsinan, yet in spite of all, two adults of the second (sea-born) generation appeared in the laboratory at Tsinan, on the 10th October, although, unfortunately, both of them were females and had to wither on the virgin thorn.

A. A.

YOUNG (T. C. McCombie). **Some Observations on Sandflies in Bombay City.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 679–683. [7 refs.]

The author discloses the unsuspected existence in Bombay City of *Phlebotomus argentipes*, *P. papatasii*, and *P. minutus* and its *niger* variety. The first, which is obtrusive only in the three months preceding the inset of the S.W. monsoon (although it can be detected by nocturnal search " at all times "), occurs in the vicinity of cowsheds throughout the city, and has been found even in good houses. The second, which has been complained of in good houses, mostly in the neighbourhood of the earthworks connected with the Back Bay reclamation, disappears with the inset of the S.W. monsoon. *P. minutus* and its variety have so far been found on three occasions in three separate places.

Contingent on the link between *P. argentipes* and kala azar the author points to the observation of NAPIER and others of a strip of the west coast which includes Bombay where the conditions of temperature and humidity seem comparatively favourable for the transmission of that disease. Cases of kala azar are said to have come to light occasionally in the City, although the disease has been declared officially to be " practically unknown " in the Presidency of Bombay.

A. A.

ROSSI (P.). Contribution à l'étude du phlébotome en Aunis. [**A Study of Phlebotomus in Aunis.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 705–709.

*Phlebotomus perniciosus* is not a rare insect at Aunis where (at La Rochelle) the author has studied its habits in nature and to some extent in captivity. His observations are in general accord with those of those other observers of other species.

The adult insects are to be found only in summer (June to September), and then only in fine weather, since they cannot endure wind or rain. In the day-time they hide in underground rooms, privies, etc., and at evening they go out to feed, not flying far from their breeding-haunts. When hungry, however, as they are after detention by a spell of windy or rainy weather, they will feed at any time of day. Usually they bite only the exposed parts of the body. Females are to males in the proportion of 6 to 1. In captivity the female lays her eggs, to the number of 12 up to 18, on the 9th day after repletion, and dies that day or the next. The male lives only 7–9 days. The eggs hatch in about 10 days, always in the night time, and humidity is an imperative condition. The author's observations appear to have been interrupted at this point by some earth-born myriapods, which devoured his stock. *Phlebotomus perniciosus* is not known to have any pathogenous significance at Aunis. It is very sensitive to chloroform, benzene, and ether ; less so to naphthalene and thymol.

A. A.

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NITZULESCU (V.). Sur la constitution du canal alimentaire chez les phlébotomes. [**The Food Canal in Phlebotomus.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 709–714. With 5 text figs. [1 ref.]

The author's conclusions from his own dissections and cross-sections of the proboscis is that the floor of the feeding-tube of Phlebotomus is formed not by the hypopharynx but by the mandibles. LEON, according to the author, has noticed an analogous disposition of the mouth-parts in *Culicoides pulicaris.*

A. A.

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NITZULESCU (Virgil). Contribution à l'étude de l'appareil buccal des simulides. [**The Buccal Apparatus of the Simuliidae.**]—*C.R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. pp. 1336–1338. With 2 text figs. [1 ref.]

The author states that in Simulium the relations between the mandibles and the unpaired mouth-parts are better shown in transverse sections of the proboscis than in simple dissections. His transverse sections show the existence of a longitudinal ridge on each mandible, which catches the corresponding incurved edge of the labrum-epipharynx to form a closed tube with the mandibles for a floor. When the mandibles are thus adjusted to form the epipharyngeal tube they also roof-in the hypopharyngeal salivary groove.

A. A.

PINTO (Cesar). *Phlebotomus neivai* e *Phl. fischeri* N. Sp. Sp.—Sobre o apparelho espicular dos phlebotomos e seu valor especifico. [*P. neivai* **and** *P. fischeri* **from S. Paulo.**]—*Sciencia Med.* 1926. July 31. Vol. 4. No. 7. pp. 370–375. With 6 text figs.

These two new species, both from the province of S. Paulo, Brazil, are described, and good figures are given of their male genitalia and of their maxillary palps. A figure of the male genitalia of *P. brumpti* of Larrouse —a third Brazilian species—is given for comparison, along with a brief differential diagnosis of this species.

PATERSON (G.) & SHANNON (R. C.). Nota preliminar sobre *Phleb. Araozi*, n. sp. [**Preliminary Note on** *P. Araozi*, **n. sp.**]—*Semana Méd.* 1926. July 22. Vol. 33. No. 29 (1697). pp. 236–237.

No description is given of this species—said to be the most southerly species of the genus Phlebotomus known to occur in S. America. It was first observed in the province of Jujuy at the north-westerly limit of Argentina.

PARROT (L.). A propos de *Phlebotomus caucasicus* et de *Phlebotomus sergenti*. [*P. caucasicus* **and** *P. sergenti.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Dec. Vol. 30. No. 12. pp. 719–720.

Draws attention to the fact that *P. caucasicus* had been adjudicated a synonym of *P. sergenti* by several good authorities.

A. A.

MUMFORD (E. Philpott). **Three New Cases of Myiasis in Man in the North of England. With a Survey of Earlier Observations by other Authors.**—*Parasitology.* 1926. Dec. Vol. 18. No. 4. pp. 375–383. [20 refs.]

The author reviews previous records of myiasis of the urinary passages—both authentic, and more or less doubtful—and relates what he regards as two fresh authentic cases, both in the humbler ranks of society. The first was of an infant which seems to have been a sickly constipated subject. It had been for some time passing offensive urine, in the course of time always preceded by cries of distress, and in time leading to inflammation of the genitalia, when at the age of about a year it became very seriously ill, getting better after a mass of living maggots had been discovered in its napkin. After this, however, its distress before micturition continued, and maggots were frequently found in its bed and its napkins. No maggots were passed after the infant was at length put under proper observation in hospital. The maggots were identified as *Fannia canicularis* and *Musca domestica.* The author emphasizes the constipation and the crying-out before the act of micturition. [He appears not to recognize the significance of the extensive inflammation in the neighbourhood of the genitalia as a suitable lodging, under cover of napkins damp with offensive urine, for eggs and maggots. Again the crying-out *before* micturition may very well be explained as anticipatory of the pain associated with the immediate and inevitable consequences following the act, when hot acrid urine floods an inflamed surface around the genitalia.] In the second supposed case the material—many fly-eggs and a few well-grown maggots preserved in formalin—was sent by a doctor who stated that they were found on the napkins (wet with urine, but not soiled with faeces) of a sick baby girl. The maggots were supposed to be *Musca domestica.* The author emphasizes the presence of well-grown maggots as well as eggs, and the absence of faecal matter.

The paper also contains some brief reference to previous cases of intestinal myiasis, and gives some particulars of a fresh case. The patient, a woman of 38, had suffered intensely from prurigo ani for about twelve months. The bowels were alternately constipated and loose, and the stools almost black. Dipterous larvae were passed after treatment with santonin and a specimen brought to the author was identified as probably a Syrphid.

A. A.

FRANCHINI (Giuseppe). Un nuovo caso di myiasi intestinale. [**A Further Case of Intestinal Myiasis.**]—*Riforma Med.* 1927. Jan. 31. Vol. 43. No. 5. p. 102. With 1 text fig.

The patient, a man of 25 years, had suffered for two years, at intervals, from pruritus ani, abdominal pain, and loose mucoid and at times bloodstained stools. All treatment was ineffectual until the discovery of larvae identified as *Muscina stabulans,* when stovarsol effected a cure. It is conjectured that ova or young larvae were ingested with food, or may have entered *per anum.*

H. Harold Scott.

BEDFORD (G. A. H.). **Check-List of the Muscidae and Oestridae which cause Myiasis in Man and Animals in South Africa.**—*11th & 12th Reports Director Vet. Education & Res.* Dept. of Agric. Union of S. Africa. Part I. 1926. Sept. pp. 483–491. [14 refs.]

——. **A Check-List and Host-List of the External Parasites found on South African Mammalia, Aves, and Reptilia.**—*Ibid.* pp. 704–817.

The useful records must at the moment be—and indeed are admitted to be—incomplete, but their value and utility is unquestionable. Of course, they cannot be abstracted to any good purpose. Among the Muscidae recorded as causing intestinal trouble in man the only unusual entry to be noticed is the larva of *Stomoxys calcitrans.*

A. A.

HADWEN (S.). **Notes on the Life History of** *Oedemagena tarandi* **L. and** *Cephenomyia trompe* **Modeer.**—*Jl. Parasit.* 1926. Sept. Vol. 13. No. 1. pp. 56–65. With 2 text figs. [5 refs.]

*Oedemagina tarandi* is the warble-fly of the reindeer, and *Cephenomyia trompe* is a cognate Oestrid whose maggot is parasitic in the naso-pharynx of the reindeer. A few words on the habits of these Oestrids may be of interest to medical men. The adult flies in both cases can make long flights. Oedemagena is oviparous, and lays eggs, in great number, on the under-fur of its host; the young larvae pierce the skin and migrate in the course of several weeks to the subcutaneous tissue of the back, whence they ultimately escape, through the skin, to pupate; the larvae grow at a regular rate throughout the year (or thereabout) of their stay in their host; yearling reindeer suffer most to attack, older reindeer gradually acquire immunity, which, however, seems to be lost again in old age. Cephenomyia is viviparous;

its larvae make very little growth during the winter months, but grow rapidly in the spring of the year ; old reindeer are more resistant than young animals.

A. A.

MUSCONI (L.). [L'accrescimento delle larve di mosca (*Calliphora eritrocephala*) in rapporto con la temperatura e l'alimentazione.] **[The Growth of Fly Larvae** (*C. erythrocephala*) **in Relation to Temperature and Food.]**—*Boll. Lab. Zool. gen. agrar. R. Scuola sup. Agric.* Portici. 1925. Vol. 18. pp. 95–115. With 8 figs. [18 refs.] [Summarized in *Rev. Applied Entom.* 1926. Sept. Vol. 14. Ser. B. Pt. 9. p. 153.]

The summarized account is as follows :—

" Larvae of *Calliphora erythrocephala* are able to live and grow between a minimum temperature of 4°–5° C. [39·2°–41° F.] and a maximum of 40°–41° C. [104°–105·8° F.]. At 0° C. [32° F.] the eggs do not develop, but are not killed and hatch if placed in a higher temperature after 3–4 days. It is possible to stop the feeding of a larva before it reaches natural size, and this does not prevent pupation. The limit of size varies with the temperature. By increasing the temperature the limit reached very closely approximates to the length that the larva would have attained if it had not been deprived of food. At a high temperature the larva eats only spontaneously for the necessary time, but at low ones it eats more than is needed for pupation. The resulting adult is smaller the higher the temperature."

A. A.

COUSIN (G.). Sur le retard de la nymphose. La limite extrême du jeûne et la réalimentation possible des larves de *Calliphora erythrocephala*. **[On Delayed Pupation. The Extreme Limit of Fast with Possible Recovery for Larvae of** *Calliphora erythrocephala*.**]**—*C.R. Soc. Biol.* 1926. Sept. 21. Vol. 95. No. 27. pp. 601–603. [2 refs.]

Normally at a temperature of 18° to 20° C. the larvae of *Calliphora erythrocephala* pass into a state of torpor 3 or 4 days before pupation. Normally this prepupal torpidity lasts for 3 or 4 days, but its onset and duration may be much modified experimentally, and this holds good not only for the normal larvae but also for the larvae prematurely dwarfed by starvation. The onset of torpor may be delayed by keeping the larvae in their pabulum, by flooding their pabulum, or by keeping them exposed to the light, and the duration of the torpid stage may be prolonged by abrupt lowering or raising of the temperature. Thus under appropriate experimental conditions one can have larvae 10 to 15 days old which either may be full grown or may be dwarfs that were fed for only the first two days of their life.

Experimenting with larvae that were kept fasting from the second day of their life, the author found that in a slightly humid atmosphere they pupated in about 4 days. If, however, when pupation was imminent, such starved larvae were, without any change of temperature and humidity, placed on food, they began to feed at once and continued feeding for 6 or 7 days. Or, if such starved larvae were kept in bright light, at a temperature of 18°–23° C., such of them as survived 15 days of this treatment began to feed when at last they were supplied with food in a favourable temperature, and afterwards continued their development, though slowly. On the other hand if normal larvae approaching maturity are deprived of food for *three* days, and are then supplied with food they do not touch it but proceed to pupate.

A. A.

JOBLING (B.). **A Comparative Study of the Structure of the Head and Mouth Parts in the Hippoboscidae (Diptera pupipara).**—*Parasitology.* 1926. Sept. Vol. 18. No. 3. pp. 319–349. With 4 text figs. & 49 figs. on 5 plates. [25 refs.]

This is a fine anatomical study based on *Lynchia maura* (the Hippoboscid parasite of the pigeon) and interpreted by comparisons with numerous other Hippoboscid species, particularly *Melophagus ovinus* (the sheep ked). The features of the integument are noticed, and the head-capsule, the antennae, and all the mouth structures and their muscles are described in detail (with abundant illustrative figures) of which a summary is not feasible.

A. A.

HERMS (W. B.). **Hippelates Flies and Certain other Pests of the Coachella Valley, California.**—*Jl. Econom. Entom.* 1926. Oct. Vol. 19. No. 5. pp. 692–695. [2 refs.]

The small Chloropid (Oscinid) fly, *Hippelates flavipes*, known locally as " buzz gnat " (and elsewhere as the " eye fly ") causes perpetual annoyance at certain seasons by hovering round the eyelids. In the Coachella Valley, where " pink-eye " conjunctivitis is extremely common, it is believed to be concerned in spreading the infection mechanically.

Another pest in this valley is the " black widow " spider, *Lathrodectes mactans*, more feared for its bite than the rattlesnake. A local " physician stated that there had been one fatal case of spider-bite and several others had been bitten with very grave results."

A. A.

LLOYD (Llewellyn). **Report of the Tsetse Investigation, 1925.**—*Nigeria Ann. Med. & San. Rep. 1925.* Appendix E. pp. 99–106.

An experiment on the effect of excluding large game from a tsetse-fly infested tract of country half a square mile in extent was carried out; the full report of the experiment is to be published in the *Bulletin of Entomological Research* and will be noticed here when it appears. Attempts to study the effects of postponed grass-burning were frustrated, owing to native disobedience of their Emir's orders; another attempt is being made in 20 square miles of country placed under guard. An attempt at large-scale clearings is to be made during the months when labour is available. One dangerously infested pool close to a main road was cleared of about 200 acres of forest with the result of freeing a long stretch of the road from tsetse; and further clearings in other places, carried out during the dry season, have had satisfactory results in repressing fly.

In the treatment of sleeping-sickness, tryparsamide, which seems to give better results in advanced cases, has been used as well as " Bayer 205." Of 4 cases treated with the latter drug soon after the onset of the disease, one has remained perfectly fit for 37 months and three for 27 months following treatment; in a fifth case, treated at the onset with

" Bayer 205 " in succession to tartar emetic and tryparsamide, the patient remained well for about 16 months and then had a relapse having the appearance of a fresh infection ; for this he received the normal " Bayer 205 " course and again remained perfectly fit for a year, when he again relapsed and again responded to " Bayer 205 " like an early case. A A.

GOLOV (D.) & IOFF (I.). Puces de spermophiles porteuses de l'infection pesteuse durant l'hiver. [**Spermophile Fleas harbouring Plague Infection during Winter.**]—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 4. French summary pp.' 329–331. [In Russian pp. 239–248.]

The fleas of the souslik (Spermophilus) are active enough on the hibernating host, but in the absence of a host they hibernate in the vacant burrow and can go without food for at least ten months. The plague bacillus lives long enough in these starving fleas—without decrease of virulence—to conserve the infection from one seasonal epidemic to another. These conclusions appear to apply to all three species of fleas—*Ceratophyllus tesquorum, Ctenophthalmus breviatus,* and *Neopsylla setosa*—that infest the souslik. A. A.

CONNAL (Andrew). **The Rodents of Lagos and their Ecto-Parasites with Reference to Plague.**—*Ann. Trop. Med. & Parasit.* 1926. Dec. 17. Vol. 20. No. 4. pp. 341–353. With 1 chart & 1 map.

The analysis includes 167,194 rodents with 1,529 ecto-parasites. The rodents are *Mus musculus, Rattus rattus, Rattus norvegicus, Lemniscomys fasciatus,* and *Cricetomys gambianus* (and with these the Insectivore, *Crocidura manni*). The ectoparasites are *Xenopsylla cheopis* and *brasiliensis, Ctenocephalus canis* and *Laelaps echidninus.*

A. A.

BOYCOTT (A. A.). **The Reaction to Flea Bites.** [Correspondence.]—*Nature.* 1926. Oct. 23. Vol. 118. No. 2973. p. 591.

Boycott, who himself is naturally immune to flea-bite, though not to midges and mosquitoes, is of opinion that the irritating wheals that commonly follow the bites of insects are due to anaphylaxis. He instances the case of a lady who reacted severely to the bite of *Pulex irritans,* but not to that of *Xenopsylla cheopis* until after being bitten five times during six weeks—and similarly with the rabbit flea, *Spilopsyllus cuniculi.* He remarks the reluctance of the rabbit flea to bite man, and notices the deliberation with which it feeds, sometimes remaining attached for an hour if not disturbed.

A. A.

PEACOCK (A. D.). **The Reaction to Flea Bites: Anaphylaxis and Louse Infestation.** [Correspondence.]—*Nature.* 1926. Nov. 13. Vol. 118. No. 2976. p. 696.

From his experience with the American Trench Fever Commission the author gives an instance of anaphylactic manifestations in a volunteer who was injected with filtered extract of louse-excrement subsequent to an employment as " foster nurse " to clean lice.

A. A.

Uribe (Cesar). **On the Biology and Life History of** *Rhodnius prolixus* **Stahl.**—*Jl. Parasit.* 1926. Dec. Vol. 13. No. 2. pp. 129–136. With 14 figs. on 1 plate. [8 refs.]

The observations here recorded were made at Valera in Venezuela, where *Rhodnius prolixus* is very common up to 1,300 metres. The species is there believed to be strictly a house-bug ; houses sometimes have to be abandoned, so badly may they be infested—" one wonders how people can live among swarms of such reputably dangerous insects, and still appear to be in good health, as good health goes in this climate." When a house is deserted the insects migrate, either by flight or in baggage. The author found the bite painless. He describes the development of the insect and states that in his local laboratory *R. prolixus* took an average of 200 days to grow from egg to adult. He kept a female alive for about 7 months, after it had received a single feed. Larvae also can fast for weeks, and he kept one third-stage larva alive for 5 months without food. Though he put new-hatched larvae that had been starved for two weeks in company with replete larvae and nymphs, he never observed cannibalism ; on two occasions, however, he saw the starved larvae feeding on the faeces of the nymphs and older larvae—and this latter proceeding, if it be a habit in nature, may account for the spread of *Trypanosoma cruzi* infection. A high percentage of larvae, and a still higher percentage of adults, collected in houses in two towns were found naturally infected with *T. cruzi*.

A. A.

Larrousse (F.). Etude biologique et systématique du genre *Rhodnius* Stal (Hémiptères, *Reduvidae*). **[Bionomy and Taxonomy of the Genus** *Rhodnius*.]—*Ann. Parasit. Humaine et Comparée.* 1927. Jan. 1. Vol. 5. No. 1. pp. 63–88. With 9 text figs. [28 refs.]

The author includes four genera among the blood-sucking Reduviidae, and comments on the fact that they also are coprophagous and cannibalist. He treats the genus *Rhodnius* in specific detail, with nice figures. Two species of *Rhodnius* (as well as species of the kindred genera *Triatoma* and *Eratyrus*) are intermediaries in the spread of *Trypanosoma cruzi*. Six species of Rhodnius are known, all except *R. brethesi* being nocturnal in habit ; their collective range is limited to Central and South America.

The following diagnostic table of the bloodsucking Reduviidae presented by the author may be useful :—

Family Reduviidae = Subfamily Acanthaspinae

| | | |
|---|---|---|
| | Anterior disk of thorax armed with spines, its posterior angles spinous or well pronounced ... ... ... ... ... ... | Eratyrus |
| | Anterior disk of thorax without spines, its posterior angles rounded or obtusely prominent ... ... ... ... ... ... ... | 2 |
| 2 | Antennae attached near apex of head ; femora unarmed ; connexivum narrow beneath ... ... ... ... ... ... | Rhodnius |
| | Antennae not attached to apex of head ; femora armed beneath ; connexivum broad ... ... ... ... ... ... | 3 |
| 3 | Body generally smooth ; thorax little contracted ; connexivum little broadened ... ... ... ... ... | Triatoma (= Conorhinus) |
| | Body strongly pilose ; thorax much contracted ; connexivum very broad ... ... ... ... ... ... ... | Meccus |

A. A.

TEJERA (E.). Les blattes envisagées comme agents de dissémination des germes pathogènes. [**Cockroaches as Distributors of Pathogenic Germs.**]—*C.R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. pp. 1382–1384.

The author gives us a familiar catalogue of protozoa and other micro-organisms inhabiting the intestine of the domestic cockroaches, and adds instances of his own observation of the ability of these insects to entertain and to transmit in their faeces micro-organisms pathogenous to man—Giardia, Balantidium, the dysentery amoeba, and the bacilli of cholera, dysentery, leprosy, and tuberculosis—all alive and active. He therefore joins in the cry against the cockroach as a dangerous insect.

A. A.

MORISCHITA (Kaoru) & TSUCHIMOCHI (Katsuji). **Experimental Observations on the Dissemination of Disease by Cockroaches in Formosa.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. June. No. 255. English summary pp. 2–6. [In Japanese.]

The house cockroaches of Formosa are *Periplaneta americana* and *australasiae* and *Dorylaea rhombifolia*. The authors have made numerous feeding experiments with them and find that various pathogenous bacteria (typhoid, dysentery, cholera), Entamoeba cysts, and eggs of worms (Ascaris, Trichuris, and hookworm) pass through them unchanged and unharmed. The organisms do not, however, survive the passage long unless the faeces are passed in moist places.

A. A.

SENEVET (G.) & ROSSI (P.). *Ixodes ricinus*, tique des régions froides ou tempérées. [*Ixodes ricinus*, **a Tick of Cold or Temperate Regions.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 558–560. [3 refs.]

Considering it to be interesting from a pathological standpoint to have accurate information as to the geographical distribution of *Ixodes ricinus*, the authors have collected, and now publish, a list of all the places in the world where this tick has been observed. Their conclusion is that *I. ricinus* is essentially a tick of cold and temperate regions, north of 40° ; that in more southerly regions, as far as the tropic, where it can develop only in winter, it is comparatively rare ; and that in the intertropical zone its presence is exceptional.

A. A.

KLEIN (L.). **Ear Bushticks as a Human Parasite.** [Correspondence.] —*Jl. Med. Assoc. S. Africa.* 1927. Jan. 8. Vol. 1. No. 1. p. 24.

For ticks in the ear the author recommends filling the meatus with " dioxygen " for 10 to 15 minutes and syringing out the then dead tick with warm water.

A. A.

i. BESELIN (Oskar). Lebende Nymphe einer Ohrzecke (*Otiobius Megnini*) im Gehörgang einer aus Bolivien zugereisten Patientin. **[Living Nymphs of a Tick in the Ear Passage of a Patient from Bolivia.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Jan. Vol. 31. No. 1. pp. 44–45. [3 refs.]

ii. LOUBSER (Johannes N. W.). Ueber Ohrzecken (*Ornithodorus megnini*) bei Menschen in Süd-Afrika. **[Ear Ticks in Man in S. Africa.]**—*Ibid.* p. 45.

i. Records an instance of infestation of the external ear-passage by *Ornithodorus* (=*Otobius*) *megninii*. The patient was a woman, in Hamburg, who had lately come from Bolivia. The tick was extracted alive.

ii. The writer states that *Ornithodorus megninii* quite often gets into the ear-passage of man in South Africa; the tick may be either loose or attached; in all his own cases it was replete, and being loose could be washed out with a syringe and warm water.

A. A.

MEKIE (Eric C.). **Parasitic Infection of the Urinary Tract. Report of a Case of Infection of the Urinary Tract by Acari, together with an Analysis of previously Reported Cases.**—*Edinburgh Med. Jl.* 1926. Dec. New Ser. Vol. 33. No. 12. pp. 708–719. With 1 text fig. [8 refs.]

The finding of mites and their eggs in abnormal urine and the inference that they may be the actual cause of cystitis and irritation of the urinary tract has been a subject of some controversy, and MACKENZIE (this *Bulletin*, Vol. 21, p. 155) after considerable experience and some hesitancy, expressed the opinion that the mites might be derived—as he actually demonstrated in certain instances—from the hay and straw in which glass-vessels used in the laboratory are packed. In the present paper Mekie, in describing a case of infestation of the urinary tract by mites, has analysed a considerable series of similar cases recorded by other observers (MACKENZIE included), and comes to the conclusion that MACKENZIE's explanation is not all-sufficient. Mekie's own well-considered conclusions are :—

> "(1) That the urinary tract is liable to become infected by certain members of the Arachnida species; (2) that the result is a clinical picture suggesting irritation of the urinary tract and that one of the commonest symptoms is nocturnal enuresis; (3) that the urine frequently contains large sheets of epithelial cells; (4) that the presence of acari in the urine can only be assumed to indicate true endoparasitism in those cases in which they are found repeatedly and when careful precautions have been taken against contamination; (5) that a secondary micro-organismal infection of the urinary tract is liable to occur."

In the present instance the patient was a woman of 32 years, who for 16 years had suffered from slight discomfort at micturition, occasional nocturnal enuresis, and an intermittent discharge from the urethra. The urine from the beginning had been discoloured; the intervention of Venus was denied. Eventually, becoming acutely ill, she came under observation with symptoms that justified a diagnosis of acute appendicitis. At operation, however, the right kidney was discovered to be inflamed, and—the appendix being healthy—the diagnosis was changed to pyelitis.

The urine contained numerous blood corpuscles, pus cells, and many epithelium cells both single and in clumps, and a number of mites—identified by HIRST as Tarsonemus, Glycyphagus, and Tyroglyphus—also eggs, identified by HIRST as Tyroglyphus. Such a medley of species naturally prejudiced any hasty conclusions, so that the bladder was cystoscoped, and the urine both from ureters and bladder was very cautiously collected and methodically investigated for a considerable term. At the beginning of this investigation no mites or ova were found, though plenty of epithelium masses, pus cells and blood corpuscles were present; but later on Tyroglyphus was observed both in the morning urine and in catheter urine taken "with the strictest care" and avoidance of "all chance of contamination." It may be mentioned (1) that the bladder was normal, and (2) that slight growths of *Bacillus coli* were cultivated from the urine both of bladder and from both ureters. The author emphasizes the presence of masses and sheets of epithelium, as well as the fact that the mites are found in the urine not constantly but with intermittence.

A. A.

GAY (D. M.) & BRANCH (Arnold). **Pulmonary Acariasis in Monkeys.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 49–55. With 3 figs. [10 refs.]

Pulmonary acariasis is a chronic affection due to infestation of the lungs by mites of the genus *Pneumonyssus*. The mites are found encapsulated in lesions somewhat suggestive of tubercles. The authors here give a general description of 20 cases detected post-mortem in 25 common Macacus monkeys whose death was due, not to infestation with Pneumonyssus, but to enterocolitis or to tuberculosis. In these 20 cases the acari are described as being encapsulated in contiguity to bronchi though no previous communication with a bronchus could be discovered in any instance. The authors characterize the infestation as benign.

A. A.

VAN THIEL (P. H.). Eine ungelöste Porozephalusfrage. [**An Unsettled Porocephalus-Phenomenon.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 585–594. [17 refs.]

Immature forms—larvae and nymphs—of Linguatulids are sometimes found alive and locomotive in the gut and body-cavity of man and other animals, and are commonly supposed to have escaped from cysts that have been swallowed in the flesh of some other species of animal (food). This explanation is not always convincing. As an alternative explanation the author draws attention to the fact that pleurocercoids of a species of ribbon worm, *Triaenophorus nodosus*, whose intermediary host is the perch and final host the pike, are known to be able to excyst in the perch, and he inclines towards a possible analogy in the case of Linguatulids—to wit, that they may excyst in the individual animal in which they encysted.

A. A.

HEYMONS (R.). Ein Borstenwurm (Oligochät) als angeblicher Insasse des menschlichen Körpers. [**An Oligochaete as an Alleged Inmate of the Human Body.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. July 6. Vol. 99. No. 1-3. pp. 153–156.

The subject of this essay is *Pachydrilus* (=*Lumbriculus*) *lineatus* a little yellowish Oligochaete worm about half-an-inch long, commonly found in fresh water. Two specimens, passed on separate occasions alive, from a patient in Berlin, were brought to the author's notice. The author would not have regarded the matter very seriously had he not afterwards heard of two other cases occurring in Hamburg. Considering the adaptability of this little freshwater Oligochaete—to salt water, to brine pools, to all kinds of foul water, even to water polluted with chemical refuse—the author is now inclined to think that it might also make itself at home in the human intestine. He notes that BLANCHARD has included Oligochaetes, though not this particular species, among the pseudoparasites of man.

A. A.

MÜLLER (Reiner). Borstenwürmer im menschlichen Körper (*Pachydrilus lineatus*). [**Bristle Worms in the Human Body.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. Dec. 7. Vol. 101. No. 1/3. pp. 151–155. With 1 text fig. [22 refs.]

The author refutes the opinion expressed in 1926 by R. HEYMONS, that the Oligochaete worm *Pachydrilus lineatus* cannot live in man's intestine. He refers to a case, in 1922, where a man who had been suffering from abdominal troubles was relieved when he had passed a multitude of living Oligochaetes of this species. He also gives a copious extract from the record of cases where worms and numerous other kinds of animal life—maggots, beetles, mites, etc.—have been discharged, alive, from the human gut.

A. A.

GERMAIN (L.) & NEVEU-LEMAIRE (M.). Essai de malacologie médicale. [**Medical Malacology.**]—*Ann. Parasit. Humaine et Comparée.* 1926. July 1 & Oct. 1. Vol. 4. Nos. 3 & 4. pp. 286–305; 352–384. With 16 text figs. [62 refs.]

The Mollusca of this paper belong to the Class Gasteropoda, two Orders of which—Prosobranchiata and Pulmonata—furnish intermediary hosts for trematode parasites of man. Definitions are given of the class and of the relevant orders, suborders, families, genera, and species; these definitions being conveniently supplemented by some dichotomous keys and a considerable number of text-figures.

In their conclusions the authors express the opinion that, although (with rare and unverified exceptions) a specific trematode larva is restricted to one particular *order* of Gastropods in the choice of an intermediary host, the doctrine that a specific larva has an exclusive affinity for a particular *species* of intermediary mollusk is not so absolute as has been thought.

A. A.

WALTON (C. L.) & WRIGHT (W. Rees). **Hydrogen-ion Concentration and the Distribution of *Limnaea truncatula* and *L. peregra*, with a Note bearing on Mosquitoes.**—*Parasitology.* 1926. Dec. Vol. 18. No. 4. pp. 363–367. [5 refs.]

*Limnaea truncatula* in these observations in North Wales occurs over a range of pH 6 to 8·6, *L. peregra* over a range of 5·8 to 8·8, and *L. palustris* (only 3 observations) through a range of 7·4 to 8. The observers therefore are of opinion that hydrogen-ion concentration is not of vital importance for these animals. Moreover, since they found that larvae of *Culex pipiens* could tolerate water at pH 4, 7·5, and 9+, and larvae of *Anopheles maculipennis* at pH 4+, 7·5, and 10+, and also were unable to confirm MACGREGOR'S experiments [this *Bulletin*, Vol. 19, p. 476], they think that the H ion concentration of the medium cannot be of much importance for mosquito larvae. Their opinion is supported by evidence quoted from observers in other parts of the world.

A. A.

SEPULCRI (Piero). La scardola comune (varietà piccola) nella lotta antimalarica. [**The Common Fish "Scardola" (Little Variety) in Antimalaria Work.**]—*Riv. di Malariologia.* 1926. Sept.–Dec. Vol. 5. No. 5–6. pp. 663–675. With 5 text figs. [English summary p. 739.]

The author extols the "little variety" of the "Scardola" [the rudd (*Leuciscus erythrophthalmus*) a near relative of the minnow] for the destruction of anopheles larvae in Europe.

A. A.

JOHNS (F. M.). **A Method for the Routine Examination of Feces for the Ova of Parasitic Worms and Encysted Amebas.**—*New Orleans Med. & Surg. Jl.* 1926. Sept. Vol. 79. No. 3. pp. 218–221. With 10 figs.

The method recommended is the repeated centrifugation, after straining, of a watery emulsion of faeces.

A. A.

BANCHIERI (E.). Azione del veleno di cobra sull' attività di corpo intermedio (mittelstuk) del liquido cefalo rachidiana.—*Pathologica.* 1927. Feb. 15. Vol. 19. No. 424. pp. 65–67.

TALIAFERRO (W. H.). Infection and Resistance in Trypanosome Infections: Studies on the Reproduction-Inhibiting Reaction Product in Infections with *Trypanosoma lewisi*.—*Proc. Inst. Med. Chicago, 1925.* 4 pp. [3 refs.]

# TROPICAL DERMATOLOGY.

SARTORY (A.) & SARTORY (R.). Les teignes exotiques. [**Tropical Ringworms.**]—*Rev. Prat. Malad. des Pays Chauds.* 1926. July. Year 5. Vol. 6. No. 5. pp. 265–276. [1 ref.]

Dermatomycoses are very common in warm countries, especially ringworm of the scalp, herpes circinata and kerion of Celsus. On the west coast of Africa young natives are found infected with *Trichophyton tonsurans* or *Microsporum audouini.* In addition there are numerous other parasites, many of them new species, some of which have been identified, but others are as yet undescribed.

Of the genus *Trichophyton,* the following species occur in warm countries. *T. violaceum,* Sabouraud 1893, is common in Senegal and Brazil. *T. soudanense,* Joyeux 1912, causes tinea of the scalp, especially of children, in the Soudan. *T. balcaneum,* Castellani, one of the rarest species, was isolated from tinea of the scalp of an adult in Macedonia. *T. nodoformans* is found in Ceylon in cases of sycosis and " dhobi itch." *T. luxurians,* Braul & Viquier, a large-spored ectothrix with faviform cultures, was isolated from typical " kérion " in two children in Algeria. *T. albiciscans* was isolated by NIEWENIUS in 1907 in Java and Siam from cases of " tinea albigena." *T. castellani* was described by CASTELLANI in cases of " tinea intersecta " in Ceylon, but has not been cultivated. *T. ceylonense* causing " tinea nigrocircinata " in Ceylon, has been described by the same author, but was not cultivated. *T. exsiccatum* was obtained from child ringworm in Buenos Ayres by URIBURU in 1909 ; who also noted an endothrix ringworm, cultures of which were first crateriform and later polygonal and powdery. *T. sp.,* isolated by COURMANT from the head of a child in Senegal, is an endothrix with polymorphic and polychromatic cultures, which are cupuliform and straw yellow. *T. multicolor,* Neves and Magalhaes, from tinea of the scalp of a child, has cerebriform colonies. In 1925 DA FONSECA described a dermatitis among Indians which may affect all the members of a tribe, caused by a fungus culturally resembling Epidermophyton. DE MELLO and PAES in a case of tinea of the scalp of a negro child, found a large-spored endothrix with chocolate coloured, faviform cultures.

*Microsporums,* other than *M. audouini* are rare. HORTA in 1925 incompletely described a Microsporum causing herpes circinata of the neck, with quickly growing, yellowish cultures. *M. circulus centrum,* De Magalhaes, from tinea of the scalp of an infant in Rio Grande dos Sul (Brazil), has a variable cultural aspect. *M. ramos,* Horta 1924, was found in two cases of tinea of the scalp.

*Epidermophyton cruris* causes eczema marginatum which is common in both temperate and tropical zones. *E. rubrum,* Castellani 1910, causes " tinea cruris." *E. perneti* is rare in Ceylon.

In the group *Endodermophyton* is mentioned the parasite of " tokelau " or " tinea imbricata," first met with in the Malayan Archipelago, and which spread to the islands of the Eastern Pacific and is widely distributed in French Indo-China. TRIBONDEAU in 1901, described the parasite as an Aspergillus under the name *Lepidophyton*; and this was confirmed by JEANSELME, WEHMER and DUBREUILH. WEHMER found distinct Aspergillus fructifications and established definitely the species *Aspergillus lepidophyton.* CASTELLANI nearly always found the same fungus, a sterile form, in "tokelau," and also isolated *E. indicum* from the same tinea, with which the inoculation to man is positive.

*Achorions* are scarcely known in hot countries. *A. gallinae* was isolated by the authors and PETEGES of Bordeaux, from a case of ringworm contracted in the French colonies.

P. Tate.

OTA (Masao). Sur quelques champignons pathogènes du type *Trichosporum beigeli* Vuillemin. [**Pathogenic Fungi of the Type of** *T. beigeli* **Vuillemin.**]—*Ann. Parasit. Humaine et Comparée.* 1926. Jan. Vol. 4. No. 1. pp. 1-13. With 3 text figs. [11 refs.]

The genus *Trichosporum* Behrend 1890, contains the species *T. beigeli* Vuillemin 1901, isolated from cases of tinea nodosa, *T. giganteum* Behrend 1890, causing "piedra" of Colombia, *T. ovoides* Behrend 1890 and *T. ovale* Unna 1896, which are all parasitic on the surface of hairs. The genus has two forms of sporulation, one by blastospores and the other by arthrospores. It is thus intermediate between the Blastospores and Arthrospores of VUILLEMIN; and the author suggests reserving the term Blastospores for the forms developing only by blastospores, and enlarging the Arthrospores to include forms producing both blastospores and arthrospores in addition to those with arthrospores only.

It is considered that the following forms also fall within the genus Trichosporum: *Mycoderma cutaneum* de Beurmann, Gougerot & Vaucher 1919, *Parendomyces asteroides* Rischin 1921, *P. balzeri* [Bakzer Burnier & Gougerot 1911], *Hemispora rugosa* [Castellani 1910], *Oospora perieri* Matruchot & Antoine 1917, *Oidium pullulans* Lindner—non-pathogenic. All of these show yeast, oidial, mycelium, and chlamydospore forms. The yeast is the principal cultural form, and generally one polar bud is produced, but a second bud at the same or at the opposite pole, and, rarely, a third bud, may be formed. The oidial is less frequent and arises either by a spore giving rise directly to a closely septate mycelium or by a spore giving rise to a chain of blastospores in one of which transverse walls are formed. Mycelium is formed when development is vigorous and may arise directly from an initial spore or by the elongation of the cells of a chain of blastospores. It soon becomes divided up into chains of arthrospores. The chlamydospores are protoplasmic condensations surrounded by thick membranes. Pseudo-conidia may be formed through buds arising on the flank of mycelial filaments with or without denticulations at their point of insertion.

On the same medium the cultures of the different species are identical; and none ferments glucose, maltose, saccharose or levulose.

P. Tate.

POPOV (P.). [**A Case of Trichonocardiasis in Armenia.**]—*Russian Jl. Trop. Med.* 1926. Nos. 6–7. pp. 59–61. With 2 text figs. [7 refs.] [In Russian.]

A case of trichonocardiasis was observed by the author in Armenia. The condition is referred to as Tinea flava, and was caused by *Nocardia* [*Discomyces*] *tenuis*. The affected hairs were in the right axilla and had turned yellow, those in the left axilla and on other parts of the body being black.

C. A. Hoare.

SILVA (Flaviano). Considerações em torno de um caso de "Purú-Purú." [**Discussion on a Case of Purú-Purú.**]—*Brazil-Medico.* 1926. Aug. 28. Year 40. Vol. 2. No. 9. pp. 113–119. With 4 text figs.

This interesting paper describes a case of Purú-Purú and discusses the diagnosis and nature of the condition. The patient was a married woman, 32 years of age, who a year previously had raised a callosity on her right hand from grating cassava. This became inflamed and pustular and she opened it with a piece of orange-stick (espinho de laranjeira). Later, there appeared at this site a white spot the size of a pin's head, which spread, accompanied with intense itching. When seen by the author there were achromic areas contrasting with others hyperpigmented on both hands and feet. They were 1–2 mm. in size individually, but coalesced to involve considerable areas, as seen by the very clear illustrations. Some in an early stage were slightly scaly.

The diagnosis between this and vitiligo, pityriasis (in which the hands and feet escape), the Tinea alba of Ceylon, Tinea albigena of Indo-China, Java, and elsewhere, Cryptococcosis epidermica of Castellani, is discussed and each dismissed in turn as differing in some essentials from Purú-Purú. The disease most closely resembling it is Caraté or Pinto (though this also is rarely found on the hands or feet), and from the scales the author was able to cultivate a mould with the characters of Aspergillus, and he thinks that at the opening of the original pustule this had been inadvertently inoculated.

H. Harold Scott.

ONORATO (Raffaele). I micetomi in Tripolitania. [**Mycetoma in Tripolitania.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1926. Jan.–Feb., Mar., Apr.–May, June, July–Aug. Vol. 7. Nos. 1–2, 3, 4–5, 6 & 7. pp. 1–8; 33–50; 65–83; 97–110; 137–152. [17 refs.]

This series of papers forms a valuable contribution to the elucidation of an intricate subject and might be published as a separate thesis or brochure with advantage.

The first part clears the ground by giving CARTER'S original definition of Mycetoma, followed by those of Pseudomycetoma and Paramycetoma by CHALMERS and ARCHIBALD. To the latter, which CHALMERS and ARCHIBALD have defined as Mycetoma without or with very sparse granules, the author would add "but always containing eosinophil or Russell bodies."

Though in favour on the whole of CASTELLANI'S classification, Onorato holds that the subdivision of maduromycoses according to country—

Asiatic, European, African, American—is weak and unscientific, and compares it to the name *Necator americanus* as misleading for a nematode coming from Africa. He suggests that a better classification than that according to colour of grains is one according to species as in the appended table, modified, as far as his cases exemplified, from the longer table set out in the first section. In the succeeding sections he gives detailed descriptions of 19 cases with the cultural findings where these were attempted and the results of inoculation-experiments. We cannot here relate the various cases, for details of which the original must be consulted, and they are well worth it, but they suffice to show that a variety of these infections occur in Tripolitania. Most of them appear to have been previously diagnosed erroneously as actinomycosis.

We may summarize the cases given by saying that of the 19 recorded, there were 11 infected by Micromycetoma, 6 by Hyphomycetoma, and 2 by Paramycetoma. Putting aside those with Paramycetoma and considering for purposes of drawing conclusions the remaining 17, we find (1) that *age* has no influence ; in succeeding decades there were 2, 3, 4, 3, 4, and 1 cases ; (2) as regards *sex*, more occurred among males, namely 14 to 3 females, but this is explained by the fact that the former were, from the nature of their work, more liable to small wounds, injuries and local infections ; (3) *Site* ; in 6 one or other foot was affected, in 5 the lower jaw, in 2 the face ; other sites were the vertebral column, the clavicle, and the vertex. The condition began generally as a small nodule, superficial or deep, gradually increased in extent and depth and, in the earlier stages, resembled a neoplasm, and was at times diagnosed as fibroma, sarcoma, chondrosarcoma, etc. Subsequently, smaller nodules developed, opening at the surface to discharge pus with granules, white, black, red or yellow. The course was a prolonged one, spontaneous cure never occurred ; the case recorded by NEVEU-LEMAIRE in 1908, the author states, was probably not a true mycetoma, though he does not give his reasons for doubting it.

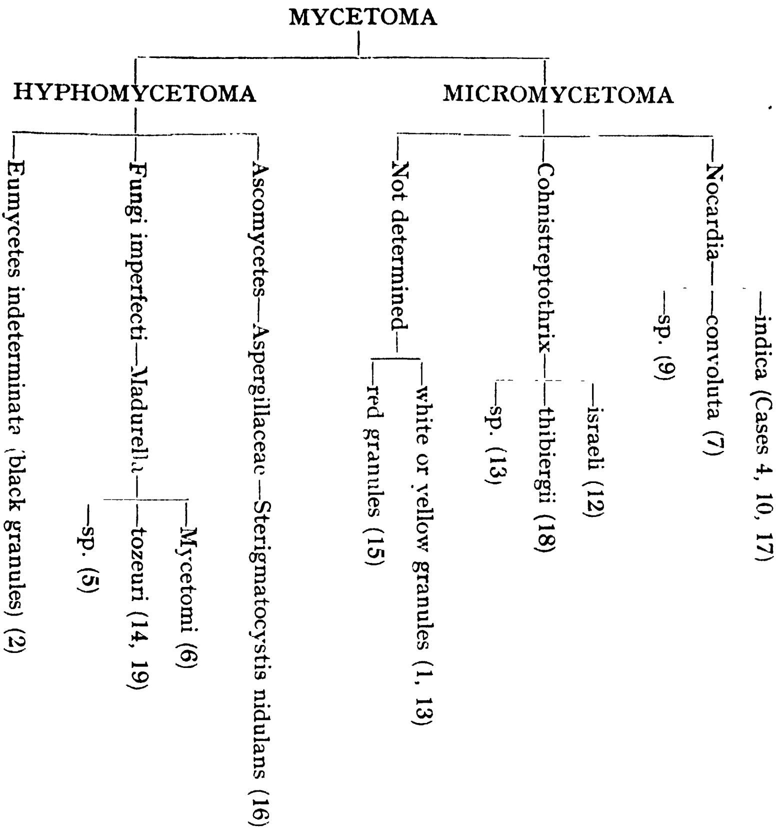
If left to itself, it invades muscles and bones. A description of the morbid anatomy and histology is given, agreeing largely with what is stated in modern text-books—the spreading amongst tendons and muscles and opening to the exterior by sinuses, the formation of cavities imperfectly lined by a sort of membrane made up of tissue detritus in which the cells are no longer recognizable, the destruction of the epiphyseal cartilages, rarefying osteitis and necrosis, and so on. Lastly, the presence of granules with mycelial filaments, surrounded by epithelioid cells, and in the paramycetomas the Russell bodies. Particularly noticeable is the absence of any true barrier to the advancement of the destructive process.

Infection arises from injury by splinters of wood, thorns, fragments of grasses, and suchlike on which the fungus is saprophytic.

There appears to be neither immunity nor predisposition, and prophylaxis consists in protecting the skin, especially that of the feet, from injury, and the prompt treatment of small wounds. The treatment of the condition itself is surgical, aided by the use of iodine as potassium iodide. Sometimes benefit seemed to result from injection into the sinuses of a suspension of iodoform in ether or in Ziehl's liquid as used for acid-fast staining, diluted 1 in 5.

Vaccine therapy, tried by MONTPELIER, is ineffectual.

H. Harold Scott.



ANDERSON (Ch.), BROC (R.) & CASSAR. Deux nouvelles observations tunisiennes de mycétome. [**Two Fresh Tunisian Cases of Mycetoma.**]—*Arch. Inst. Pasteur de Tunis.* 1926. Dec. Vol. 15. No. 4. pp. 332–335. [3 refs.]

The first case of 10 years' duration, concerning an agricultural labourer, with the disease involving the entire right foot was due to *Scedosporium apiospermum.* The second case of some 3 months' duration, in a labourer, was an affection of the right foot about the metatarsophalangeal articulation of the big toe, the site of a previous injury. Accompanying the lesion of the foot was an enlarged gland in the corresponding Scarpa's triangle. Cultures from the case showed *Discomyces madurae.*

W. Jenkins Oliver.

CATANEI (A.), GROSDEMANGE (L.) & LEGROUX (Ch.). Sur un cas de mycétome du pied observé en Algérie. [**Case of Mycetoma of Foot seen in Algeria.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 11–13. [2 refs.]

Report of a case of 7 years' duration in an Algerian native, in whom the condition had first shown itself while he was working in a factory in France some 4 months after leaving Algeria. The affection involved practically all the tissues of the right foot which was amputated. Cultures of the white grains proved the infecting fungus to be *Nocardia madurae.* Lack of knowledge of the rate of penetration by the fungus prevents the determination of the date of infection.

W. J. O.

van Hoof (L.). Un cas d'actinomycose à grains blancs au Congo Belge. [**Case of Actinomycosis with White Grains from Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. pp. 225–226. With 1 text fig.

Case report of a native boy, aged 10–11 years, in whom the affection of one year's duration involved the lower jaw as a hard tumour, with softer lesions about the lateral aspects of the neck. The infection had followed caries of a left lower molar. Local and general iodine treatment proved unavailing. The fungus was cultured with difficulty, only under anaerobic conditions, from the small white grains in the pus. While the exact nature of the parasite could not be determined, it was considered to belong to a *Cohnistreptothrix* species, perhaps *C. thibiergei* (Ravaut and Pinoy). According to the writer's knowledge actinomycosis has not been reported previously in Belgian Congo.

W. J. O.

Montpellier (J.) & Catanei (A.). Blastomycose de l'avant-bras chez une femme indigène d'Alger. [**Blastomycosis of the Fore-Arm of a Native Woman of Algiers.**]—*Bull. Soc. Path. Exot.* 1926. July 7. Vol. 19. No. 7. pp. 586–592. With 2 text figs. [2 refs.]

The lesions, which were purely tegumentary, developed in three months from a plaque 6–8 cms. in diameter until the greater part of the posterior surface of the fore-arm was covered, in spite of general and local treatment with acetylarsan and yellow precipitate of mercury respectively. Histologically the lesions resembled diffuse sporotrichosis. The general health of the subject was not affected. Treatment with "néo-riodine" was very efficacious, and after the 10th intramuscular injection the lesions were quite healed.

Pure cultures of a yeast-like organism were repeatedly obtained on Sabouraud's medium from the pus. In culture it forms globular or ovoid budding yeast cells 2·5–8$\mu$; elongated cells, 2–3$\mu$ × 9–16$\mu$, united in twos or threes and sometimes bearing several terminal or lateral buds; and, under certain conditions, septate filaments, 2–3$\mu$ wide, simple or branched, bearing oval or lateral buds. It grows well on all ordinary media at laboratory temperature, but growth is much better at 37° C. Details of the growth in a number of fluid and solid media are given. On Sabouraud's glucose white shining colonies are formed. Gelatine and serum are not liquified. Milk is not coagulated, but is made alkaline in ten days. Glucose, levulose, saccharose, and dextrin are attacked; galactose, maltose, arabinose and xylose are slightly or not at all attacked; lactose, mannite, inulin and dulcite are not attacked. In no case is gas produced. The organism is provisionally placed in the genus *Cryptococcus* under the name *C. montpellieri* Catanei 1926.

Intravenous and intraperitoneal inoculations of rabbits with large quantities of culture were negative. Subcutaneous inoculation with young cultures, 1–3 days, were negative in rabbits and gave only slight local ganglion reaction in guineapigs, but old cultures, 11–43 days, even in small quantities, produced local abscesses, in the pus of which yeast cells were present and from which recultivation was positive. Similar results were obtained by inoculating subcutaneously with splinters coated with young, 24 hours', and old, 34 days', cultures. Subcutaneous inoculation of two rabbits with a 24 hours' and a 37 days' culture, previously heated to 60° C. for 30 minutes, resulted in abscess formation from which recultivation was positive. Inoculation of a rabbit and a guineapig with a 37 days' culture heated to 60° C. for one hour also produced abscesses, but recultivation was not possible.

A series of intravenous injections of the culture produced a high specific agglutinative power in the serum of the rabbit, but did not confer immunity against subcutaneous inoculation.

P. Tate.

MONTEL (R.) & PONS (R.). Dermatite blastomycosique chéloidienne. [**Keloid Blastomycotic Dermatitis.**]—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 876–880. With 2 text figs.

Two cases of a dermatitis, characterized by crateriform ulceration, intradermal nodules and, especially, by keloid cicatrices on healing, were observed at Saigon, Cochin China. A blastomycete was observed in the pus from unopened abscesses and was cultivated. In view of the blastomycotic origin and peculiar keloid cicatrices, this dermatitis is named "dermatite blastomycosique chéloidienne." In both cases the general health was good and the condition was of long duration, 3–19 years, gradually extending peripherally and healing spontaneously in the older central regions.

In the scales and pus numerous simple or budding, usually spherical, yeast-cells, 5–6 microns in diameter, were present. On Sabouraud's medium at 37°, the optimum temperature, shining, waxy colonies are formed. In cultures of ten days giant forms, up to 20 microns in diameter, are found. Some mycelium is also developed, but the hyphae rarely exceed 50-60 microns in length. Litmus milk is not coagulated, but is reddened at the surface. Horse serum is not liquefied. Acid, but not gas, is produced in levulose, glucose and maltose; lactose, mannite, dulcite and dextrine are not attacked.

Subcutaneous inoculation of rabbits with pus or the fungus, causes death in 6 days, with generalization and very marked congestion of the kidneys, from which recultivation of the fungus is possible.

P. Tate.

SMITH (E. C.). **Prickly Heat: its Aetiology and Pathology.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 344–351. With 30 figs. (4 coloured) on 5 plates. [1 ref.]

This well illustrated communication explains prickly heat to be a dermatitis of mycotic origin, the infecting agent belonging to the Monilia group. Staining of the scales by Gram's method shows the fungus as a yeast-like budding organism (Gram positive) free or within the epidermal cells. Adamson's staining method gives better results as regards mycelial elements. On Sabouraud's medium cultures of the fungus should appear within six days as an opaque creamy-white growth. Occasionally a variety of red lead colour may be observed. (The sugar reactions of the strains are shown in tabular form.) Inoculation experiments with the cultured fungus on the human skin are positive in 4 days if applied on lint and affixed in situ, and in 24–48 hours if rubbed directly into the skin. Histological examinations of such experimentally produced lesions show changes mainly in the epidermis, with (1) the presence of vesicles or pustules, (2) affection of the hair follicles. The vesicles may be situated in either the superficial or deep layers of the epidermis, while many are about the sweat ducts. Involvement of the hair follicle is confined to that part which passes through the epidermis. The affected follicles appear dilated, with the fungus present within or between the oedematous cells forming the sheath, and in the follicular epithelium. The hairs themselves and the ducts of the sebaceous glands appear to be free from infection. The fungus is most readily demonstrated in the sections by staining with Loeffler's methylene blue. W. J. O.

GUILLON (A.). Un nouveau traitement de l'ulcère tropical. [**New Treatment of Tropical Ulcer.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Oct.-Nov.-Dec. Vol. 24. No. 4. pp. 595–596. [1 ref.]

Direct freezing of the lesions with the ethyl chloride spray, performed three or four times at two days' intervals, produced an excellent result in the writer's case. It is suggested that carbon dioxide snow might be similarly employed. Such treatment is advocated in view of the good results obtained by this method in cases of ulcerative stomatitis of spirochaetal origin.

W. J. O.

DE BELLARD (E. P.). **Ulcus Tropicum.**—*Gac. Med. de Caracas.* 1926. June 15. Vol. 33. No. 11. pp. 164–165.

The local treatment of ulcus tropicum recommended in this paper is carried out as follows: For two or three days, to obtain a perfectly clean surface, dressings of a saturated solution of magnesium sulphate are applied and renewed frequently. The ulcer is then painted once daily with pure essential oil of chenopodium, and left exposed to the air for half an hour. Next, a piece of sterilized gauze the size of the ulcer is applied and thinly covered with an ointment of protargol 10 per cent., or one made up of ichthyol gm. 10, balsam of Peru gm. 10, zinc oxide ointment gm. 80. During the night a bandage retains this in place, not during the daytime when the limb is raised and supported. Each morning after the first, before renewing the dressings, the secretions of the ulcerated surface are washed away with 1 per cent. chloramine-T solution.

The same treatment is said to be good also for varicose ulcers, and those due to syphilis or leishmania, specific treatment being carried out at the same time.

H. Harold Scott.

NEJROTTI (Mario G.). Ulcera fagedenica tropicale e sua cura. [**The Treatment of Tropical Sloughing Phagedaena.**]—*Riforma Med.* 1927. Jan. 3. Vol. 43. No. 1. pp. 9–10.

The chief indications in the treatment of this condition are cleanliness, antisepsis and protection. The author finds Calot's liquid the most satisfactory. This consists of iodoform 10; sulphuric ether 30; olive oil 70; pure creosote 6 parts; the mixture to be thoroughly shaken before use to obtain a uniform suspension of the iodoform. It is applied every other day on gauze, and covered by wool and a bandage. Tonics (iron, arsenic, etc.) and generous diet are also needed.

H. Harold Scott.

SELISKY (A. B.). Zur Histologie der Creeping Disease. [**The Histology of Creeping Disease.**]—*Arch. f. Dermat. u. Syph.* 1926. Nov. 13. Vol. 152. No. 1. pp. 123–125. With 1 text fig. [1 ref.]

Report of a case of infection of the left cheek by the Gastrophilus larva occurring in a young cab driver, considered to have taken place by direct transference of the larva from the horse to the skin of the face. The histological features of the larva and tunnel are described: these were a disintegration and degeneration of the epidermal cells, increase of pigment which was present in nearly all the epidermal layers, rarefaction of the connective tissue and wide dilatation of the blood vessels of the cutis. The larva itself lay just below the horny layer displacing the remainder of the epidermis. The tunnel contained masses of badly stained cell detritus and was surrounded by perivascular and periglandular round-celled infiltration.

W. J. O.

AUSTMANN (Kristjan J.). **Creeping Eruption. Report of First Case from Manitoba.**—*Jl. Amer. Med. Assoc.* 1926. Oct. 9. Vol. 87. No. 15. pp. 1196–1200. With 1 text fig. [47 refs.]

This is an excellent summary of the subject of "Creeping Disease" of the skin—its several causes, its lesions, its geographical distribution according to cause, and its treatment—with 47 references to original papers.

The cause in the present case was a larva of *Gastrophilus intestinalis* (of the first stage). The patient after working in the hayfields had noticed an itchy spot on the elbow, and subsequently a red streak creeping with itchings about his forearm. The author, who began to observe the case 4 weeks afterwards, notes that the rate of progress of the circuitous streak was about 1·5 cm. a day, and that there were no vesicles in its vicinity—a point which he thinks to be distinctive from the eruption caused by the nematode Gnathostoma.

For subsequent observation and treatment he bethought him of Lombard's method of clearing the living skin. He therefore, using ordinary clear machine oil, cleared the epidermis around the end of the line of creep. Then, using a binocular dissecting microscope, he saw the parasite lying, apparently between the cornified and the granular layers of the epidermis, at a distance of about 13 mm. from the end of the line. With a magnification of 150 diam. the details of structure were clearly seen. Successive observations showed the parasite to have advanced 8 mm. in the course of four hours.

With a needle and the aid of a pocket lens the parasite was removed from the clarified epidermis, without pain to the patient, and was subsequently accurately identified. The author thinks that Lombard's device may be useful in dealing with other parasitic diseases of the skin.

A. Alcock.

FÜLLEBORN (F.). Eine seit 20 Jahren bestehende, der " Creeping Eruption " ähnliche wandernde Hautaffektion aus Ostafrika. **[A Case of Fluctuating Skin-Eruption, of the Nature of " Creeping Eruption," of Twenty Years' Duration from East Africa.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Nov. 1. Vol. 30. No. 11. pp. 702–704. With 1 text fig.

The patient in this case gives a very clear and trustworthy account of an eruption on the forefinger of the right hand which at the time of its appearance felt very much like the effect of an insect-bite. The eruption has continued to break out, at intervals of a week to a month, at different points in the same finger, for twenty years. No parasite has been found, but the author conjectures that the cause must be a wandering parasite—probably a nematode larva.

A. A.

DOBRONRAVOV (W.). [Un cas de " Creeping Disease "] **[A Case of Creeping Disease.]**—*Russian Jl. Trop. Med.* 1926. Nos. 6–7. pp. 41–46. With 2 text figs. [7 refs.] [In Russian.]

The author describes a case of " creeping eruption " observed in Moscow, due to a single larva of the bot-fly, *Gastrophilus equi* (= *G. intestinalis*) which had burrowed into the upper part of the left foot. It is estimated that 2½ months elapsed from the time of infection to the full development of the larva. The first symptoms were the appearance of a red spot on the skin, which caused considerable itching. The larva commenced burrowing a week later and progressed at the rate of 2 cm. a day, until, on the tenth day, its burrow reached a length of 12 cm., when it was extracted. The burrow appeared as a fine, reddish, irregular line, 1 mm. wide, with the epidermis raised 2 mm. above it.

C. A. Hoare.

DELORME (M.). Transmission expérimentale de *Sarcoptes scabiei*, var. *cuniculi*, au cynocéphale (*Papio sphinx*, E. Geoff). **[Experimental Transmission of Itch Mite to the Baboon.]**—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 899–900. [1 ref.]

An interesting note of the transmission of the *Sarcoptes scabiei* var. *cuniculi* from a rabbit to a baboon. The infected crusts were applied under a dressing for five days to the shaved head of the monkey. The infection, so induced, remained entirely localized to the scalp and cleared up without any treatment in the course of 3 weeks. Six months later the affected areas remained depilated, owing to the monkey developing a habit, occasioned by the itching disease, of sleeping with the lower left palm in contact with the head and of adopting this attitude under the slightest excitement.

W. J. O.

VENERONI (Carlo). Il " Mossy Foot " nella Somalia Italiana. **[Mossy Foot in Italian Somaliland.]**—*Ann. di Med. Nav. e Colon.* 1926. Sept.–Oct. Year 32. Vol. 2. No. 3–4. pp. 164–166. With 1 text fig.

The author describes a condition, which he concludes to be Mossy foot, met with in Somalia. The illustration given appears to confirm the diagnosis which, however, was made chiefly on negative grounds—long clinical course of over 5 years in some instances, the preservation of a good general state of health, a negative Wassermann reaction, negative results of examination for parasites, leishmania, spirochaetes, fungi, or *B. tuberculosis* and the inefficacy of treatment by mercury, iodides, salvarsan, or tartar emetic. [With cases so well marked one would expect the finding of the yeast-like cells described by MEDLAR in sections of tissue, and the fungus, *Phialophora verrucosa*, recorded by numerous writers on the subject, but no mention is made of these; in fact, as stated, examination for fungi proved negative.]

H. Harold Scott.

VIEIRA (João Paulo Botelho). " Dermite de Durhing " sua variedade entre nós.—(Fogo selvagem. Pemphigus tropical.) [**Dermatitis of Durhing—Tropical Pemphigus.**]—*Brazil-Medico.* 1926. Aug. 21. Year 40. Vol. 2. No. 8. pp. 102–104.

The author refers to two cases of this condition, denominated locally Fogo selvagem [Wild fire] reported by him in 1922, treated by chaulmoogra, which he regards as a specific for the disease. These patients have remained in perfect health. In the present paper he records three more cases and discusses the points of difference between the condition as noted in England, France, and the United States, and that found in Rio de Janeiro.

The main features of the Brazilian variety are that it is a chronic affection liable to exacerbations accompanied by fever, that it leads to cachexia and to profound disturbance of the nervous system, central and peripheral. The actual lesion is at first vesicular, later pustular; the most frequent sites of attack are the chest, fore-arms and legs, but it may involve any part of the body except the palms and soles. If occurring on the eye blindness may result. Ankylosis of the knees and of the joints of the hands are common. The disease may be accompanied by various phobias, night-terrors, marked irritability, often with ravenous appetite and hyperchlorhydria. The cause is at present unknown; it may be a nutritional disease, or have some relation to leprosy. These questions the author intends to discuss in a future paper. He is of opinion that it is inoculable, and he notes that in the districts where it occurs there are large numbers of *Triatoma megista*.

H. Harold Scott.

NICOLLE (Charles) & CONSEIL (E.). Chronique tunisienne du *Xeroderma pigmentosum*. [**Xeroderma pigmentosum in Tunis.**]—*Arch. Inst. Pasteur de Tunis.* 1926. Dec. Vol. 15. No. 4. pp. 341–343. [4 refs.]

Two new familial cases of Xeroderma pigmentosum from two families are reported, concerning (1) a boy (now dead at age of 8 years) who had first shown evidence of the disease when aged 6 years, and (2) a girl aged 12½ years in whom the affection commenced at the age of 6 months. These bring the number of local cases recorded to the total 19.

W. J. O.

SCHRÖPL (Ernst). Neurodermitis durch Oxyuren. Ein Beitrag zur Pathogenese der Prurigo. [**Oxyuris Prurigo.**]—*Dermat. Woch.* 1926. July 24. Vol. 83. No. 30. pp. 1083–1097. With 5 text figs. [37 refs.]

Four cases, all concerning males, are recorded of prurigo of 2–4 years' duration associated with threadworms, the skin lesions being situated mainly over the lower half of the abdomen, hips and sacral regions, buttocks and upper part of the thighs. The first sign of the affection was itching, which was followed by the appearance of the skin lesions consisting of flat-topped papules, discrete or grouped, situated chiefly about the follicles. The skin of the affected areas showed considerable pigmentation and prominent follicles. The histological appearances are described. One case of 2 years' duration showed thermohyperaesthesia, while the cases of longer duration showed a lowering of sensibility to pain and temperature. The intracutaneous injection of oxyuris extract gave a positive focal reaction in one case. Attention is drawn to the alcoholic family history of all the patients. The central spinal anatomical relations of the nucleus of the splanchnic nerve to those of the pain, temperature and vasomotor nerves are described in detail to explain the reflex action due to the impulses arising in the intestine on these sensory and vasomotor nerve systems, the impulse being one of irritation induced by the toxin of the threadworms.

W. J. O.

CORDES (Wilhelm). Künstliche Malariainfektion bei Dermatitis herpetiformis. [**Malarial Inoculation in Dermatitis herpetiformis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Dec. Vol. 30. No. 12. pp. 713–715. With 1 text fig. [1 ref.]

The apparent beneficial effect of a measles infection on a case of dermatitis herpetiformis, in a boy aged 4 years, suggested experimental treatment by inoculation with malaria parasites. The result was negative in regard to the healing of the disease ; indeed a more severe outbreak of skin lesions occurred during the period following the last bout of fever.

W. J. O.

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KATO (Yutaka). Note sommaire sur les trichophyties dans les provinces de Kiushiu et dans les îles de Riukiu et sur deux espèces nouvelles de Dermatophytes : *Trichophyton coccineum* et *Bodinia spadix* n. sp.—*Japan Jl. Dermat. & Urol.* 1926. Feb. & Mar. Vol. 26. Nos. 2 & 3. In Japanese pp. 79–110. With 41 text figs. pp. 196–230. With 59 text figs.

# PLAGUE.

HIRST (L. Fabian). **Researches on the Parasitology of Plague. Part I.** —*Ceylon Jl. Sci.* (Sect. D. Med. Sci.). 1926. Dec. 18. Vol. 1. Pt. 4. pp. 155–271. With 6 figs. on 1 plate, 2 charts & 2 text figs. [57 refs.]

We have here a closely reasoned argument of the exact connexions between the species, the bionomics and biting powers of fleas infesting rats and the occurrence of plague. It was in 1913 that Hirst discovered that *X. astia* was the sole infesting flea of rats of the two principal plague-free cities of the Orient, Colombo and Madras. He expressed the view that this fact sufficed to account for their freedom, on the grounds that *X. astia,* under the tropical conditions prevailing in these areas, was an inefficient vector of plague both from rat to rat and from rat to man. He considers that *X. cheopis* was only introduced into Colombo in 1914 ; he considers also that it has only to be introduced into any port on the Madras seaboard in sufficient quantity under circumstances favourable to its becoming established on the rats in the vicinity of granaries for plague to appear there, as it has done in Colombo.

The general conclusion is reached, as a result of detailed experimental and epidemiological research, that the spread of bubonic plague among rats throughout the world and thus to man depends primarily on the *cheopis* population of the invaded region. We have as factors in propagation of the epizootic : (1) The degree of *cheopis* infestation per rat, which is dependent primarily upon the effect of climate on *cheopis* reproduction and secondarily on the nature and contents of the premises within which the *cheopis* is reproduced ; (2) the rat population, which depends primarily on food supply. It follows naturally from this, and is the author's view, that preventive measures in areas in which *X. cheopis* is not indigenous should consist (1) in disinfection of all flea-infested merchandise imported from *cheopis*-infested regions, and (2) in rat-proofing of all premises where grain is stored in bulk.

Much of the experimentation to determine the relative efficiency of *X. cheopis* and *X. astia* as vectors of plague turns on the discovery of BACOT and MARTIN (1914) that plague could be transmitted as a result of the single bite of an infected flea by regurgitation of blood from the proventriculus, so blocked with bacilli that blood could not enter the stomach. Plague is not to be considered merely as a disease affecting man and the rodent, but also as a disease of the flea vector itself. It is reasonable to suppose that *X. astia* succumbs to the disease sooner than *X. cheopis.* Hirst never found a blocked flea of the former species alive at laboratory temperatures in Colombo even during comparatively cool weather. And yet he had no difficulty in producing blocked living *cheopis* or in infecting rats by this agency. A continuous series of positive results could be produced with this species even during the hot weather. The tentative explanation is given of the low vector efficiency of *X. astia* as due to depression of vitality by heavy growth of plague in the alimentary canal. " As *astia* bites at shorter intervals than *cheopis,* blockage of the proventriculus leads to more rapid death by inanition especially under conditions of high temperature or low humidity."

But it is not maintained that *X. astia* is never a transmitter of plague. Recent work indicates that the difference in vector efficiency between *astia* and *cheopis* in a place like Colombo diminishes when the climatic conditions become more favourable to the viability of both. A good measure of the effect of climate is the egg-laying ratio of the plague flea, although longevity of the unfed flea may be the more sensitive index of effect of humidity. And this brings the author to the consideration of the possibility of a forecast of probable plague incidence. An estimate made even a few weeks in advance would be extremely valuable and this, it is maintained, may be based upon the measure proposed above.

Part I of this important memoir concludes with a chapter on the species of fleas parasitic upon rats.

W. F. Harvey.

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PIRIE (J. H. Harvey) & MURRAY (W. A.). **Plague in the North-West of the Cape Province.**—*Jl. Med. Assoc. S. Africa.* 1927. Feb. 12. Vol. 1. No. 3. pp. 50–59. With 1 map & 3 graphs. [5 refs.]

This is a paper read at the S.A. Congress in 1926. It deals with the general aspects and contains little that is new. Dr. INGRAM provided the entomological notes :—

On the Namaqua gerbille the only flea found is *Xenopsylla eridos*, and the larvae breed in the dry sand of the burrows. The fleas found on the Karroo rats are, in order of frequency, *Chiastopsylla mulleri* sp. nov. (80 per cent.) ; *Listropsylla agrippinae* ; *Ch. rossi* ; *X. eridos* and *Hypsophthalmus aganipes*. It is likely that *X. eridos* is the principal carrier of plague in the district on account of the variety of its rodent hosts. It has been found experimentally to be a carrier from rodent to rodent and bites man. On hares only *Ctenocephalus canis* and *X. eridos* are found. [*ante*, p. 37 (INGRAM and PIRIE)].

J. H. Tull Walsh.

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RAYNAL. Rapport sur l'épidémie de peste de Diégo-Suarez en 1924. [**Epidemic of Plague at Diégo-Suarez, 1924.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Oct.–Nov.–Dec. Vol. 24. No. 4. pp. 467–512. [2 refs.]

The plague infection was apparently introduced into the Ville-Basse quarter of Diégo-Suarez (Madagascar) from some ship in the port and from there a rodent epizootic carried the disease to the quarter of the Octroi and to Tanambao. The cases were mostly of the bubonic type—54 cases with 48 deaths. But in addition 10 cases of septicaemic plague and 5 cases of primary pulmonary plague were recorded ; all fatal. The hospital mortality was 79 per cent. in spite of rapid treatment with anti-plague serum given intravenously in doses of 100 to 200 cc. daily. The epidemic appeared in the dry season and ceased before the first rains. The cases were almost confined to natives working in the depots or in the shops along the quays. The diagnosis was confirmed in the laboratory in human cases and in rodents.

J. H. T. W.

TOURNIER (E.). Sur la gravité de la peste pulmonaire à Madagascar. **[The Gravity of Pneumonic Plague in Madagascar.]**—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 667–670. [3 refs.]

The author compares the virulence of pulmonary plague and the number of cases in Madagascar with those reported by M. Marcel LEGER from Senegal (*Bull. Soc. Path. Exot.* 1926. June. p. 415) :—

| | *Cases.* | *Deaths* |
|---|---|---|
| Madagascar ... ... | 917 | 860 |
| Senegal ... ... ... | 140 | 75 |

In Madagascar these cases develop in four or five days, often more rapidly, and nearly all are fatal. At Tamatave, where anti-plague vaccination is considerable and repeated, the disease seems to be less serious than on the High-Plateau, where vaccinations are few. Thus anti-plague vaccination appears to be the best weapon for checking extension of the disease. Treatment, in addition to intravenous injections of anti-plague serum, which has not given much success, was purely symptomatic and general.

J. H. T. W.

SICÉ (A.). Considérations sur l'évolution de la peste dans la province de Fort Dauphin (Madagascar Méridional) de 1924–1926. **[Plague in Southern Madagascar, 1924–6.]**—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 106–113. With 8 text figs.

From the end of 1924 to 1926, thirty-seven cases were actually recorded. The disease appeared in the septicaemic and bubonic forms. Of 19 cases that received early treatment only 5 died ; while 18 cases not receiving treatment all died. Several of the cases are described in detail. Subcutaneous injections of serum were followed by recovery. To economize serum, which was difficult to obtain, auto-haemotherapy was employed. Blood drawn from veins at the elbow was injected in 20 cc. doses under the skin of the abdomen with good results and without local or general reactions.

J. H. T. W.

ZABOLOTNY (D.) & OMÉLIANSKY (W.). [Edited by.] La peste endémique au Sud-Est de U.S.S.R. **[Endemic Plague in South East Russia.]**—pp. xiii+111. With numerous illustrations. 1926. Leningrad : Édition de l'Institut de Médecine Expérimentale.

This essay deals in great detail with plague in general and with outbreaks among human beings and rodents in South East Russia. It is a useful compilation, but contains nothing new. Much of the information has appeared in previous papers by Zabolotny, WU LIEN TEH, NIKANOROW, etc.—see index of vols. of *Bulletin.*

J. H. T. W.

NAIDU (B. P. B.) & SHAMSHER JANG. **The Treatment of Plague with Mercurochrome-220 Soluble.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 323–328. [13 refs.]

As the result of experiments on animals the authors report :—

1. Mercurochrome-220 soluble is lethal to plague bacilli in a dilution of 1 in 3,200 after contact for 15 minutes.

2 & 3. When injected hypodermically it was not lethal to rats in doses of 10 milligrammes; nor was it lethal for rabbits in similar doses per kilo of weight, when injected intravenously.

4. In the treatment of plague doses, whether single or repeated, totalling in all from 5·0 mgm. to 73·5 mgm. have no influence on the duration or termination of plague in rabbits and rats [v. this *Bulletin*, Vol. 22, p. 378 (BALFOUR)].

J. H. T. W.

WU LIEN-TEH. **Practical Aspects of Plague in Wild Rodents.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 815–836. [34 refs.]

Much of the information conveyed in this paper has appeared in previous papers by the same author [*v.* Index to previous vols. of this *Bulletin*]. The Summary is to the following effect: The ectoparasites of wild rodents play a principal part in the transmission of plague from animal to animal and from animal to man. Complete evidence is furnished in the case of the Californian ground squirrel and Siberian marmot.

Extermination of wild rodents suffering from plague is a difficult process and where permanent results cannot be attained concentration upon indirect methods must be considered.

The tarabagan being a great economical asset, lies in a class of its own. Consequently a special plague policy should be adopted in districts inhabited by this rodent.

J H. T. W.

i. MARRAS (F. M.). **The Value of the Thermoprecipitin Reaction in the Diagnosis of Rats putrefied and died of Plague.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 281–285. With 1 plate. [6 refs.]

ii. ——. **A Rapid Method for the Diagnosis of Plague.**—*Ibid.* pp. 287–290. With 3 plates (2 coloured). [3 refs.]

i. In rats that have recently died of plague we can easily observe the characteristic lesions of plague. The temperature of Bombay favours rapid putrefaction; hence the impossibility of the culture method and the inconstant results of inoculation. The thermoprecipitin reaction is not constant for rats dead of plague and putrefied. The positive results have an absolute value, because the result is nearly always confirmed by inoculation on animals.

ii. The author found that the plague bacillus ferments glucose and laevulose solutions more rapidly than mannite. Lactose, saccharose and dulcite are not changed by the plague bacillus (Plate XI). The medium used was:—

1,000 cc. distilled water.
10 gm. peptone (free of sugar).
5 gm. sodium chloride.
15 cc. of 10 per cent. solution of carbonate of soda.

The sugar solution (coloured blue with litmus) is added. Fermentation usually begins after 20 hours in glucose and nearly at the same time for laevulose; in mannite between 24 and 48 hours. The colour of the liquid medium changes little by little into a vivid red owing to the production of acid which reacts with the litmus. To accelerate the multiplication of germs and the sugar fermentation a small quantity of immune rabbit serum is added. The reaction may then occur within 5 to 7 hours and signs of agglutination of the bacilli can be seen under the microscope (Plate XIII). In the experiments the tubes were inoculated with bacilli from a broth culture. They could be inoculated from a patient.

J. H. T. W.

WILLIAMS (C. L.). **Experimentally Produced Late Bacteremia and Resolving Plague in Rats.**—*Amer. Jl. Trop. Med.* 1926. Sept. Vol. 6. No. 5. pp. 367–375. [4 refs.]

The results of the author's experiments were: 5·1 per cent. of 310 plague infected rats recovered from the infection and were found to have lesions of resolving plague when killed 21 days after inoculation. 6·8 per cent. of 890 had lesions 30 days after inoculation and 2 of 39 after 46 days. Nine killed 21 days, eleven after 30 days and one after 46 days after infection had plague bacilli in their tissues as demonstrated by positive results of guineapig inoculations. The occurrence of plague "carriers" among rats appear probable. [That the continuance of plague is mainly due to such "carriers" among rodents is not a new theory and is we think fairly obvious—see this *Bulletin* index to previous Vols.; also WILLIAMS *ante*, p. 34.]

J. H. T. W.

v. PREISZ (H.). Zwei eigenartige Varianten des Pestbazillus. [**Two Variants of the Plague Bacillus.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. Dec. 7. Vol. 101. No. 1-3. pp. 65–77. With 1 plate. [3 refs.]

Bacilli which pass through hundreds of generations in an extremely short period of time, as compared with higher forms of life, offer an excellent field for the observation of variation. Two variants are described in this study. One possessed the property of forming a smoke-grey to black pigment. This pigmentation appeared only in old cultures and especially in secondary offshoots of the original. Subculture from these pigmented offshoots gave rise only to unpigmented colonies which might later develop pigmentation.

The second variant appeared as colonies of liquid or slimy consistence, which might live only for 2 or 3 days. The bacilli of this type of colony are enormously swollen and finally burst, when the colony shrinks to a dim imperceptible disc. The phenomenon suggests disease of the organism or bacteriophagy, for these colonies give rise on subculture to similar colonies. But it has not been possible to transmit the disease to normal strains of the *B. pestis* or to other organisms, nor are the colony appearances of bacteriophagy demonstrable.

W. F. Harvey.

NAIDU (B. P. B.) & SHAMSHER JANG. **The Toxicity and the Immunising Value of Sensitised Anti-Plague Vaccines.**—*Indian. Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 319–321. [6 refs.]

Agar cultures of *B. pestis* were sensitized with rabbit, sheep and horse immune sera respectively and these vaccines were compared with an unsensitized serum-agar vaccine and with Haffkine's prophylactic vaccine. An immunizing dose of 0·5 cc. was injected subcutaneously into rats, and 7 days later the animals were subjected to a testing dose of 0·003 mgm. of spleen of a rat that had just died of acute plague. Some of the animals succumbed to the immunizing vaccine. The numbers left for test of the three sensitized vaccines were 57, 43, and 68 respectively and for the unsensitized agar vaccine and Haffkine prophylactic 55 and 46. Fifty untreated animals furnished the control. Percentage mortalities for the five vaccines and for the control were 61·4, 51·1, 44·1, 61·8, 50·0, and 14·0 in serial order. They show that, under the conditions of the experimentation, the sensitized vaccines showed no advantage over the unsensitized.

W. F. H.

BURNET (Et.). Recherches sur les formes filtrantes des bactéries. Expériences sur la bactérie de la peste. **[Filtrable Forms of Bacteria. Experiments with the Plague Bacillus.]**—*Arch. Inst. Pasteur de Tunis.* 1926. Dec. Vol. 15. No. 4. pp. 292–304.

SCHAUDINN in 1904 postulated the existence of invisible filtrable stages in the life cycle of various haematozoa and spirochaetes. This idea of connexion between the visible stage of development of an organism and an invisible or granular filtrable stage has been gaining adherents. The examples which may be adduced in support of it are: The visible colonies and forms derived from the filtrate of peripneumonia bovine virus; the filtration of *B. suipestifer*; the existence of filtrable forms of *B. tuberculosis*; the existence of an invisible filtrable virulent stage of the spirochaete of relapsing fever; the hypothesis that *Proteus* X19 is the macroscopic form of the invisible typhus fever virus; the observation in filtrates of bouillon cultures of B. Shiga and *B. typhosus,* lysed by bacteriophage, of granules capable of reconstructing the normal form; the observation of the virulence of the filtrate of the condensation fluid of cultures of *T. lewisi*; the virulence of filtrates of organs infected by *T. brucei*; the possibility that the filtrable virus of scarlet fever may be derived from *Str. scarlatinae,* that filtrable poliomyelitis virus may be derived from a polymorphic micrococcus, that filtrable influenza virus may be derived from *B. influenzae* or *B. pneumosintes*; the observation that infraparticles set free from Rous sarcoma cells are possessed of neoplastic characters. It was HEIDENHAIN who conceived the idea that every cell was resolvable into elementary infracorpuscles, capable of regenerating the cells—" *Omnis cellula e granulo.*"

This constitutes the introduction of the author and gives the basis of his experimentation. His essays to obtain infracorpuscles from variously treated cultures of *V. cholerae, B. proteus, B. subtilis, B. pestis,* and *B. diphtheriae* all failed. There remained the test of virulence for the supposed " inframicrobe " and he chose *B. pestis* as the most suitable organism for the purpose because of its pathogenicity for laboratory animals. Experiments on mice, which were utilized at various stages of plague infection, yielded one positive result. In this positive case all the organs of 2 mice were ground up to give a suspension, which was kept to autolyse for 5 hours at 35° C. and for 24 hours at room temperature. The inoculation of the filtrate of the suspension through an L1 Chamberland candle was negative in mice, but the simple filtrate itself developed on the third day a culture of *B. pestis.* A second set of experiments was made with the autolysed organs of plague guineapigs and here two positive results were forthcoming. The first was given by the filtrate of the suspension of the organs of a guineapig inoculated with human plague bubo. No infection of guineapigs was obtained with the filtrate, but two tubes to which fresh bouillon had been added gave true cultures. The second was given by the filtrate of purulent exudate from a guineapig previously immunized to plague and inoculated intraperitoneally. The L1 filtrate gave no culture on this occasion but killed a guineapig with plague in dose of 2 cc. on the ninth day. A third set of experiments with plague fleas proved entirely negative.

The positive results would indicate that the filtrable forms are to be found particularly in infected tissues and not in laboratory cultures. The tissues, moreover, were themselves already suppurating and autolysing, as well as the bacteria which they contained. It is concluded that the filtrable forms of *B. pestis* are particles or granules derived from the lytic disintegration of the bacteria. In any case, it may be concluded that filtrable forms of *B. pestis* do exist.

W. F. H.

LEGER (Marcel). La peste au Sénégal de 1914 à 1924.—*Ann. de Méd. et de Pharm. Colon.* 1926. July–Aug.–Sept. Vol. 24. No. 3. pp. 273–318. [43 refs.]

## CHOLERA.

TOMB (J. Walker) & MAITRA (G. C.). **On "Agglutinating" and "Non-Agglutinating" Vibrios found in the Human Intestine and in Water, and the Relationship between them.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 537–540. [2 refs.]

Ground tanks had previously been found heavily infested with non-agglutinating vibrios, especially during the epidemic season of cholera. That these vibrios were derived from human carriers is shown by the effect of closure of tanks to washing after defaecation, when the vibrios disappeared in 10 to 12 days only to reappear in 24 hours after re-opening. At least 30 per cent. of the inhabitants using the tanks were, by a peptone enrichment method of cultivation in open bowls, shown to be permanent carriers of non-agglutinating vibrios. What then is the relationship of these non-agglutinating vibrios to agglutinating cholera vibrios, from which they differ in no way but this character, as judged by the laboratory tests employed? In several small and localized epidemics of cholera the tanks of the infected villages immediately became heavily infested with non-agglutinating vibrios, which disappeared with the subsidence of the epidemic. The stools of cases of recovery from cholera were examined and showed disappearance of all vibrios after 2 to 3 weeks in 70 per cent. and persistence of non-agglutinating only in 30 per cent. Non-agglutinating vibrios, moreover, are found in very constant association with sporadic, as distinct from epidemic cholera. As test of transformation of agglutinating vibrios into non-agglutinating, the author selected tanks free from vibrios, inseminated them with fresh cholera stools containing large numbers of agglutinating vibrios and examined the water 2-hourly thereafter. In every instance the water showed between the 12th and 20th hour none but non-agglutinating vibrios.

They make the striking deductions that:—

1. The agglutinating vibrio found in cholera dejecta and the non-agglutinating vibrio found in carriers and in water contaminated with human faeces are one and the same organism.
2. The non-agglutinating vibrio is the permanent form in nature and constitutes the reservoir of endemic cholera.
3. The non-agglutinating form of vibrio is changed into the agglutinating form under favourable conditions in the human intestine.

W. F. Harvey.

TOMB (J. W.) & MAITRA (G. C.). **A New Conception of the Epidemiology and Endemiology of Cholera.**—*Indian Med. Gaz.* 1927. Feb. Vol. 62. No. 2. pp. 61–64. [7 refs.]

The argument is that investigations have revealed that sporadic cholera is very constantly associated with non-agglutinating vibrios which differ from the vibrio of Koch in agglutinability alone. Extended research has proved that no carriers of agglutinating vibrios could be demonstrated. Outbreaks of epidemic cholera have been observed where no history of immediate infection from an outside source could be obtained. The authors noted that during the hot weather (March to June) vibrios were numerous in the ponds and tanks in the Asansol

Mining Settlement used for washing after defaecation. On such washing being forbidden it was found that the vibrios gradually diminished and always disappeared after 12 to 14 days. When they attempted to isolate vibrios from the stools of people who had visited the tanks the results were completely negative. Thinking that the ordinary peptone enrichment process was unsatisfactory for isolating vibrios from solid stools, the authors used the "open-bowl" method (*Indian Med. Gaz.* Feb. and Nov. 1926). For the examination of stools from cholera cases a different method is used. By means of the open-bowl method it was shown that in endemic areas of the Mining Settlement as many as 35 per cent. of the inhabitants were chronic carriers of non-agglutinating vibrios. A non-agglutinating vibrio injected into a rabbit caused death and from the gall-bladder the authors recovered a partially agglutinating vibrio. Efforts to convert non-agglutinating vibrios into the agglutinating type were inconstant and inconclusive. Agglutinating vibrios from fresh cholera stools were sown in a tank free from vibrios and all changed into the non-agglutinating type after 12 to 14 hours.

"We have therefore been driven to the unavoidable conclusion that the non-agglutinating vibrio . . . takes on the agglutinating characteristic under certain bio-chemico-physical conditions in the human intestine the nature of which are at present unknown, and in this mutation or epidemic form is the cause of epidemic cholera, since it is not unreasonable to assume that a characteristic so unstable may as easily be acquired as lost.

"Non-agglutinating intestinal vibrios therefore in our opinion constitute the reservoir of cholera both epidemic and endemic."

"When once therefore cholera has been introduced into a community in widespread epidemic form, great numbers of chronic carriers of non-agglutinating vibrios remain—apparently for years."

"We have been unable to ascertain by experiment whether or not the agglutinating vibrio immediately after it has lost agglutinability is still capable of conveying epidemic cholera, but from our combined observations in the field and laboratory we conclude that the vibrio is capable of conveying cholera for some time after agglutinability has been lost."

J. H. Tull Walsh.

BERCOVITZ (Nathaniel). **The 1926 Hoihow Cholera Epidemic.**—*China Med. Jl.* 1926. Dec. Vol. 40. No. 12. pp. 1237–1240.

The author's conclusions are of some interest as distinctly referring to medical work in China. An interesting account is given of how the town was cleaned and the sale of food in the streets forbidden :—

1. Sanitary measures will prevent epidemics of cholera.
2. General admission of cholera patients into general hospitals is impracticable because the other patients will all leave.
3. The most valuable remedy was warm, slightly hypertonic saline solution ; "with regard to the cases that died the only thing we might have done better as far as we know would have been more intensive treatment with intravenous saline."

J. H. T. W.

SKINNER (A. H.). **A Note on Cholera Sicca.**—*China Med. Jl.* 1926. Sept. Vol. 40. No. 9. pp. 850–851.

The author believes that text-books do not emphasize how easily this type of cholera may be overlooked : (1) When cases are few ; and (2) when the patient is unknown to the physician, i.e., when he cannot easily judge of the change in the patient's appearance: shrinking of face, fingers and feet, pulse feeble; voice feeble and husky; suppression of urine and bladder empty (catheter). Treatment: Intravenous saline injections until urination takes place.

J. H. T. W.

GAVINO (C.). **Cholera Cases admitted in San Lazaro Hospital from September 1 to November 30, 1925.**—*Jl. Philippine Islands Med. Assoc.* 1927. Jan. Vol. 7. No. 1. pp. 3–7.

The author deals with 284 cases admitted into the San Lazaro Hospital between September 1st and November 30th, 1925. Of these cases 189 were residents in the city of Manila and 95 were from the provinces; 76 of the total number died. The 1925 outbreak was characterized by the greater number of cases with profound toxaemia as compared with those of the epidemic in 1918–1919.

J. H. T. W.

LIEO (K. W. John). **Treatment of Cholera. A Study of the Routine Treatment of 1,281 Cases from the Chinese Infectious Diseases Hospital, Shanghai.**—*Nat. Med. Jl. China.* 1926. Dec. Vol. 12. No. 6. pp. 473–485.

The author rightly believes that "the careful observation and stewardship of any large number of cases imply a certain responsibility to one's fellow workers" and he gives a brief report of 1,281 cases of cholera treated in the Chinese Infectious Hospital, Shanghai, during 1925. For transfusion normal saline solution was employed. The mortality was only 28 per cent. and saline was given without delay to all cases in the algid stage. Of the 1,281 cases 519 recovered, 423 were improved, 31 unimproved, 141 died and 168 were discharged against advice. For general treatment in addition to transfusion (if indicated) were used: camphorated brandy, Kaolin as a free drink, sodium bicarbonate gr. xxx with pot. citrate gr. xv three times a day, and 2 per cent. sodium chloride solution when nausea and vomiting were present. Atropine was useful for dyspnoea. For acidosis sodium bicarbonate was given as routine treatment ½–1 drachm four times a day. The "essential oils" mixture proved useful; one must not be discouraged if the first one or two doses provoke vomiting; the result is good, in early cases, after six doses. Ten cases—the details of which are given—were treated with mercurochrome-220, either before collapse or after transfusion. Clinical observations which were carefully made seemed to indicate that intravenous injection of this drug in no way interfered with the progress of the infection. Anti-cholera vaccine was used as a means of personal prophylaxis.

J. H. T. W.

i. BHARATI (S. Rajaram). **Observations on the Treatment of Cholera with Essential Oils, Mistura Pro-Diarrhoea and Permanganate of Potash.**—*Indian Med. Gaz.* 1926. Dec. Vol. 61. No. 12. pp. 596–597.

ii. CANNON (Alexander). **The Essential Oil Treatment of Cholera.**—*Brit. Med. Jl.* 1927. Jan. 15. p. 98.

i. The author finds that the "essential oils mixture" is of value as early treatment in cholera. Cases treated with essential oils before the onset of the algid stage seldom go on to the stage requiring intravenous saline injections. He finds that potassium permanganate pills are often passed unchanged in the stools. Eighteen cases were treated, six of which passed into the algid stage and received saline injections ; 83 per cent. recoveries.

ii. Dr. Cannon also recommends the essential oils mixture (TOMB's formula) and gives details of eight cases. His bacteriological examinations showed that, following the administration of Dr. TOMB's mixture, the vibrio ceases to exist in the stools after a period of six to twelve hours [see this *Bulletin*, Vol. 20, p. 737 (TOMB)].

J. H. T. W.

TAKANO (Rokuro), OHTSUBO (Itsuya) & INOUYE (Zenjuro). **Studies of Cholera in Japan.**—League of Nations. Health Organisation. C.H. 515.—121 pp. 1926. Dec. Geneva.

These studies, extending over a number of important and controversial subjects, form a comprehensive and critical survey of research on cholera. Only a few points can be extracted, from what is to all intents and purposes a monograph on cholera.

I. *Culture Media.* Although a highly alkaline medium is considered to be the best for the isolation of *V. cholerae*, OHNO (1912) found that all strains did not grow equally well in it and recommended the use of peptone water of different degrees of alkalinity. MATSUO (1924) gives the range of growth as from pH 4·5 to 11·3, while that of *B. coli* is from 3 to 10·8. The cholera vibrio thrives well at pH 9–10 and at this point *B. coli* is greatly inhibited.

II. *Examination of the Cholera Vibrio.* Vibrios are agglutinated by the normal serum of the horse, ox, sheep, dog, rabbit, guineapig and man in this order of strength, and of these animals the rabbit, on immunization, furnishes the best diagnostic serum. If immunizing injections are too frequently repeated the agglutinin titre is increased but specificity is diminished ; that is to say group agglutinins for non-pathogenic vibrios make their appearance. KABESHIMA (1922) considers that both typical and atypical cholera vibrios are capable of causing epidemics.

III. *Types and Variations of Cholera Vibrios.* FUKUSHIMA (1913) injected the cholera vibrio into the gall bladder of a rabbit and allowed it to remain there. He obtained at the end of 105 days a vibrio growing at the bottom of the peptone water tube, having little motility, giving colonies which were hard and did not suspend homogeneously, of low virulence and incompletely agglutinable. On the other hand, TOYOSHIMA (1918) cultivated a non-pathogenic vibrio in cholera-immune serum, in a filtrate of cholera culture, and in symbiosis with *V. cholerae*, by which means he converted a non-agglutinable vibrio into an agglutinable one. KABESHIMA (1913) recognized the existence of two types of cholera vibrio and separated them, according to their agglutination reactions, into typical and atypical. The atypical vibrio was capable of being changed in various ways into the typical and *vice versa*. WATANABE, KAWAI and WATANABE accepted Kabeshima's views, but classified their cholera vibrios into three types. NOBECHI (1921, 1922) found a cholera vibrio intermediate in type between the typical and atypical.

IV. *Cholera-like Vibrios.* Agglutination tests are not, according to AMAYA (1920), absolute, and therefore animal tests may have to be carried out.

V. *Agglutination Reactions.* Thermostable and thermolabile receptors of cholera vibrios are described, with immune serum containing agglutinins for each receptor. This is true for all types of cholera vibrio, but the relative proportions of the receptors may vary. It has often been shown that the agglutinability of the cholera vibrio cultured on a medium containing cholera immune serum is diminished. MIYAKE & INOUYE (1921) both produced evidence for the existence of two agglutinogens in cholera. It would appear generally that the agglutinability of *V. cholerae* is easily altered. In practice it is recognized that there are some organisms other than cholera which are agglutinated by cholera serum.

VI. *Cholera Vaccines.* The two types of vaccine favoured in Japan have been a heat-killed suspensiou of vibrios and a sensitized vaccine. Much research has been undertaken into the respective values of these. As to the preventive effect of vaccine in practice, it is admitted that it is difficult to compare the infection rate in the vaccinated and unvaccinated. Nor do there appear to be sufficient data for the estimation of degree of protection conferred. The strain of organism which furnishes antigen is all important, but according to KOYAMA (1924) no biological characteristic indicates the antigenic power of any given strain.

VII. *Biological Characteristics.* Research upon the cholera toxin has occupied workers in Japan as elsewhere. TAKANO (1918) came to the conclusion that it was difficult to distinguish between the exotoxin and endotoxin. This subject merges with that of the haemotoxin of true cholera vibrios. KABESHIMA (1913) concluded that there are haemotoxic and non-haemotoxic cholera vibrios, but haemolytic action is not a fixed but an easily variable characteristic of the cholera vibrio. TOSHIMA (1919) found that when a non-haemolytic strain of cholera is grown in symbiosis with a haemolytic non-pathogenic vibrio, the former acquires haemolytic properties. " Many non-pathogenic vibrios," he argues, " have no haemolytic action, so haemolytic activity is not an important point of differentiation between pathogenic and non-pathogenic vibrios."

VIII. *The Fate of the Cholera Vibrio Outside the Body.* The viability of the cholera vibrio in sea water and other waters, on the surface and in the intestine of fish and oysters, and on vegetables has been studied and also in this connexion the disinfection of food.

IX. *Clinical Studies.* Among carriers the majority (52 out of 112) were found by SAKAI (1916) to be excreting only on the day of their discovery. He gives a frequency distribution of the number of days of carriage which shows clearly how small are the numbers excreting after the 8th day, although there were cases still showing on the 19th, 20th, and 21st days. He states that the highest titre of the serum of 84 carriers examined by him (1917) was 2,000 and that over one-third had a titre over 200. Moreover, the highest titre was only reached in many cases on the 4th, 5th, 8th, and 9th days after their determination as carriers. OSHIMA (1922) reported on the examination of cholera patients.—If the rate of excretion of the vibrio during the first week be set down at 100 per cent., the rates in the 5 subsequent weeks were 45·6, 25, 16·2, 7·3 and 1·6 respectively. The longest period of excretion noted by him was 40 days.

Serum therapy in cholera has not been over-successful. MURAYAMA found that in mild cases the intravenous or subcutaneous injection of glucose (3 per cent. in 0·3 per cent. or 0·85 per cent. salt) had good effect.

X. *Cholera Epidemics in Japan.* The history and epidemiology are considered and many useful tables are given.

W. F. H.

TOHYAMA (Yuzo). **Experimental Investigations concerning the Prevention of Epidemic Diseases due to Aquatic Products. (First Report.) [Cholera.]**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1925. Vol. 4. pp. 169–222. With 11 charts. [44 refs.]

This is a paper of detailed laboratory experiments on the vitality of the cholera vibrio on and in the bodies of fish, oysters and clams. Investigations were also made into the resisting power of *V. cholerae* to temperature, humidity and disinfectants. *V. cholerae* and *V. Metschnikoffi*, maintained in the Institute, were used in these experiments. The author points out that the Japanese are the greatest eaters of fish in the world, especially raw fish; thus any connexion between this kind of food and epidemic diseases is important.

*V. cholerae* when applied to the body of fish or to strips of fish will die in boiling water in 1 to 2 minutes; longer if the fish is very large. Concerning the period of survival of *V. cholerae* placed on fish it is recorded that fish of 22 kinds, comprising bonito, mackerel, tunny, sardines, etc. (with cuttle-fish included), were dipped in liquid containing 20·0 mgm. of active *V. cholerae* in 1·0 litre of physiological salt solution. These fish were kept, some at room temperature (summer) and some in the refrigerator, and examined daily. Fish left in the room produced a bad smell in about 36 hours; those in the refrigerator began to degenerate in a week. The tables show that at room temperature the vibrio survived:— on fresh fish or sterilized for from 5 to 10 days; on fish in the refrigerating room from 14 to 25 days. On prawns, shrimps and cuttle-fish, under the same conditions, the survival period was shorter. There is no relation between the kind of fish and the period of survival. With regard to the penetration of *V. cholerae* into the deeper flesh of fish it was shown that penetration through fresh and healthy epidermis is impossible; if the fish is injured, soft or decayed, penetration occurs. Another point examined was the sterilizing power of salt as used in curing fish. The purer the salt the greater the sterilizing power; but even in the refrigerating room the vibrio lived 15 days in 1 per cent. and 5 per cent. solutions; for 3 days in 10 per cent. and for 24 hours in the saturated solution, 30 per cent.

Experimental studies were made on the intrusion of *V. cholerae* into the oyster. Oysters in the shell or otherwise, dipped in fresh or salt water infected with *V. cholerae,* will take the vibrio into stomach and intestines even in one minute irrespective of their, the oysters', life or death. The duration of life of the vibrio in the oyster and clam ranged roughly from 4 to 40 days under experimental conditions. The effect of acetic acid applied to infected oysters was to cause the death of vibrios on the surface in 2 hours by a 1 per cent. acid solution; those in the stomach require about 4 per cent. for their destruction.

J. H. T. W.

INOUYE (Zenjuro) & KAKIHARA (Tatsuo). **On the Types of the Strains in the Cholera Epidemic in 1925 in Japan and the Classification of** *Vibrio cholerae.—Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1925. Vol. 4. pp. 17–27. [17 refs.]

The organisms isolated in this epidemic along with others were investigated morphologically, culturally, biochemically, for virulence, and serologically. It is interesting to note that the haemolytic properties were tested with erythrocytes of different species of animals, and that whereas horse and guineapig erythrocytes were definitely haemolysed, those of ox, rabbit and sheep were either weakly or not at all haemolysed. The research had mainly to do with separation of the *V. cholerae* into types after the pattern of the pneumococcus. The types arrived at are three, of which Nos. 1 & 2 are the extremes and No. 3 represents, as does No. 4 for the pneumococcus, those organisms which do not belong to one of the extreme serological types. Thus the authors recommend the adoption for cholera of types 1, 2, and 3.

W. F. H.

HACHITANI (Tsunetaro), TAKITA (Jungo) & SHOETENSACK (Mark). [**Studies on the Strain of Cholera Vibrio cultivated from Cases occurring in 1925 Epidemic, and on the Varieties of Cholera Vibrios found Non-Cultivated.**]—*Saikingaku Zasshi* (*Jl. of Bact.*). 1926. Dec. No. 358. [Summarized in *Japan Med. World.* 1926. July 15, Vol. 6. No. 7. pp. 191–192.]

A comparison is instituted between 1,025 strains of cholera isolated in the Japanese epidemic of 1925 with strains obtained in other epidemics. Four types were separated. The basis of typing was the agglutination by the serum of rabbits immunized with the various strains available. As a result the following were differentiated: (1) a 1925 strain; (2) a 1911 strain; (3) a Shanghai strain; (4) an El Tor strain. The agglutinating serum of the El Tor group reacted to titre with the Shanghai group, but not *vice versa.*

W. F. H.

YASUHARA (Setsutaro). **How long does Cholera Vibrio live in the Water in Winter?**—*Jl. Public Health Assoc. Japan.* 1926. Sept. Vol. 2. No. 9. pp. 1–3.

From November 1925 to January 1926 cholera prevailed in the Wakayama prefecture, the centre of the epidemic being a port called Katsuura. As the result of the author's experiments on the life of the cholera vibrio in winter we find that *V. cholerae* survived:—

11 days in sea water.
13 days in water at the river mouth.
8 days in river water.
8 days in waterworks water.
6 days in well water.

[*v.* this *Bulletin*, Vol. 22, p. 391 (OHWADA); Vol. 18, p. 357 (FLU); also index to previous vols.].

J. H. T. W.

RAY (Jyotis Chandra). Versuche ueber die septicämischen und enterotropen Eigenschaften der Choleravibrionen. [**Septicaemic and Enterotropic Characters of the Cholera Vibrio.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1927. Jan. 27. Vol. 107. No. 1. pp. 46–55. [16 refs.]

Laboratory (Hyg. Inst. Berlin) cultures and cultures received from Paris and Calcutta were used in doses ranging from 1-6th up to a whole agar slope. Parenteral introduction, whether subcutaneous, intravenous, intraperitoneal or intracardiac could, with large doses, and more particularly with freshly isolated strains, produce a septicaemia and appearance of *V. cholerae* in small intestine, large intestine, liver, and gall bladder. This appearance of the vibrios in the intestine may be due to passage into the gut with the bile or to passage through the intestinal wall from the capillary blood vessels; it is closely related to the occurrence of bacteriaemia. But the favouring action of bile, quite apart from passage into the intestine with the bile, is undoubted. Whether the bile provides satisfactory conditions for life in the intestine or favours the passage through the intestinal wall in the way that in oral administration it favours passage of antigen in the reverse direction or whether some other explanation is to be sought for their presence, is not yet evident. With the production of a septicaemia and the proof of its pathogenicity to pigeons the special characters which distinguish *V. cholerae* from *V. metchnikowi* disappear.

W. F. H.

LANDSTEINER (K.) & LEVINE (Philip). **On a Specific Substance of the Cholera Vibrio.**—*Proc. Soc. Experim. Biol. & Med.* 1926. Vol. 24. No. 3. pp. 248–249. [2 refs.]

This investigation was concerned with the procural of an alcohol-soluble specific substance. No such substance could be detected in extracts made with ether or hot absolute alcohol; they were present in hot 75 per cent. alcoholic extracts of the bacilli, previously washed with saline and extracted with ether and hot absolute alcohol. A sediment separated from this solution on cooling, which reacted with anticholera serum up to 1–500,000 dilution of the antigen, gave protein reactions, and acted as antigen on injection.

With further purification, specific substance was obtained as a white water-soluble powder containing carbohydrates, which failed to give any biuret reaction and had slight if any antigenic activity. None the less it reacted with immune sera in a dilution of 1–500,000.

The original antigenic activity could be explained if the alcohol extract contained a complex antigen of protein and the specifically reacting but non-antigenic substance.

W. F. H.

EISLER (M.) & KOVÁCS (N.). Untersuchungen ueber das Verhältnis des Präzipitinogens und Hämotoxins des Vibrio Kadiköj und das Unvermögen dieses Toxins, sein spezifisches Antitoxin zu flocken. [**Relationship of Precipitinogen and Haemotoxin of** *V. kadiköj.* **Inability of this Toxin to give Flocculation with its Antitoxin.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. Sept. 20. Vol. 99. No. 7-8. pp. 518–545. [31 refs.]

A bouillon filtrate of *V. kadiköj* which contains both precipitinogen and haemotoxin (haemolysin) gives with specific antiserum a precipitum containing almost all the toxin. If the specific serum contain antitoxin, then the toxin-antitoxin combination is found in the precipitum. Now the haemotoxin of a bouillon culture is retained by a filter candle, while the precipitinogen passes through with the filtrate, and this negatives the idea of relationship of the one to the other. Addition of an antitoxic serum to the filtrate gives the usual precipitum, but the antitoxin now remains behind in the serum. That is to say, the antitoxin is not bound by precipitum, in the absence of toxin. But it is also found that an entirely non-specific flocculation, such as is given by bringing together horse serum and anti-horse serum, will remove both haemotoxin and precipitinogen from Kadiköj bouillon. Thus the disappearance of the toxin-antitoxin combination from a mixture of toxic bouillon and antitoxic serum must be due to adsorption of that combination by the flocculi representing the combination between precipitin and precipitinogen.

These facts were established by the use of old and fresh sera; sera containing only precipitin and sera containing both precipitin and antihaemotoxin; typical cholera sera, El Tor sera and serum obtained with a strain of *V. kadiköj*; toxin-containing Kadiköj bouillon and toxin-free bouillon of a typical cholera strain. It was also shown that there exist two different precipitinogens in Kadiköj bouillon, one of which is thermolabile and gives with its precipitin a large loose flock, while the other is thermolabile and gives a small granular compact precipitum.

This research is based on a relationship which has been supposed to exist between serum precipitinogen and its antibodies, a relationship which LANDSTEINER and PRASEK went as far as to maintain was identity. This again is based upon the fact of disappearance of antibodies such as antitoxin, antihaemotoxin and agglutinin from immune serum to which precipitinogen is added.

The research of the authors has also its backward reference to the work of NICOLLE, CESARI and DEBAIN and of RAMON, who have laid it down that when diphtheria toxin and antitoxin are brought together, maximum flocculation takes place in an exactly neutral mixture, which flocculation is the visible expression of combination of the toxin with the antitoxin. These views do not apply then to the case of haemotoxin and precipitinogen as contained in a toxic bouillon such as that given by *V. kadiköj.*

W. F. H.

KOVÁCS (Nikolaus). Zur Abtrennung und Differenzierung der Paracholerastämme von den echten Choleravibrionen. [**Differentiation of Paracholera from Cholera.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Dec. 23. Vol. 49. No. 5. pp. 457–463. With 1 coloured plate. [29 refs.]

For over 20 years controversy has been carried on over the subject whether the El Tor strains of vibrio are true cholera vibrios or are related to the latter as the paratyphoids are to the typhoid bacillus. The *Vibrio el tor* cannot be separated serologically from *V. cholerae* and it both liquefies gelatin and produces indol. But the El Tor organism produces a powerful toxin and a haemotoxin. The discussion then reduces to one of whether all degrees of toxin and haemotoxin production may not be found among true cholera strains, which would connect up the common type of *V. cholerae*, yielding neither toxin nor haemotoxin, with the El Tor type. The haemotoxic character of a vibrio is demonstrable by the haemolysis of erythrocytes in blood media; unaltered oxyhaemoglobin can be shown by spectroscopic methods to be dissolved in the culture medium. Now true cholera vibrios, especially when freshly isolated, can often produce in solid blood agar media a zone of apparent haemolysis around their colonies. But this has been ascribed to digestion of erythrocytes, for oxyhaemoglobin is not demonstrable in the surrounding medium. The difference between lysis and digestion is more or less visibly manifest by this, that in the first case the colour is light red and in the second has a greenish tinge. The blood pigment seems to be converted by the cholera vibrio to haematin. This difference of action, if difference it be, is taken advantage of by Kovács to separate the two organisms by means of a special medium. Although the El Tor vibrio has such strong haemolytic power it is only the cholera vibrio which is regarded as breaking up the haemoglobin itself. El Tor acts on the corpuscles, not on the blood pigment. Thus when the blood has been coagulated by heat, its pigment, converted into methaemoglobin, is no longer soluble or diffusible and therefore, on a coagulated blood plate, El Tor vibrios produce no zone of haemolysis around their colonies. In the case of such strains of *V. cholerae* however, as produce a clear transparent zone around their colonies on ordinary blood agar, and so resemble El Tor vibrios, the zone-producing action is still manifest even on a methaemoglobin medium. This is made the principle of differentiation by the author. The medium is prepared by adding 1·5 to 2 cc. sheep's blood to 10 cc. hot nutrient agar. In 12 hours colonies of cholera of the type specified already show on this Voges' medium a dark violet hue, before the development of any surrounding zone. Thus the two types of vibrio can be separated by the use of simple blood agar along with methaemoglobin agar without spectroscopic examination.

W. F. H.

VAN LOGHEM (J. J.). Bakteriophage und hämolytisches Endotoxin des Cholera-Vibrio. [**Bacteriophage and Haemolytic Endotoxin of the Cholera Vibrio.**]—*Cent. f. Bakt.* I. Abt. Orig. 1926. Oct. 8. Vol. 100. No. 1-3. pp. 19–21. [5 refs.]

The *Vibrio cholerae* is to be sharply differentiated from *Vibrio tor* by quantitative and qualitative tests applied to the haemolysis produced. That of *V. cholerae* is weak and slowly produced, while that of *V. tor* is strong and quickly produced. A drop of goat's blood is haemolysed in 3½ hours by a 3-day culture of Tor vibrios and not for 8 days by cholera vibrios. But other differences are present: Tor haemolysin is thermolabile (inactivated after 1 hr. at 65° C.) and antigenic (giving rise to antihaemolysin), while cholera haemolysin is neither. Thus the evidence points to the existence of an exohaemolysin in the Tor vibrio, as is also the case for water vibrios, and yet the former are agglutinated by cholera serum, whereas the latter are not. That we are only dealing with an endohaemolysin in the case of *V. cholerae* receives confirmation from the action of cholera bacteriophage in accelerating haemolysis. Thus cholera vibrio filtrate from a culture which had been treated with bacteriophage gave rise to haemolysis of goat's blood in 5 or 6 days as against 8 or 9 days for the culture which had not been so treated. On these grounds *V. cholerae* and *V. tor* are regarded as two different species of organisms.

W. F. H.

JERMOLJEWA (S.). *Vibrio phosphorescens* beim klinischen Bilde der Cholera und sein Zusammenhang mit anderen Vibrionen [*V. phosphorescens*: **its Relation to** *V. cholerae* **and other Vibrios**].—*Cent. f. Bakt.* I. Abt. Orig. 1926. Oct. 30. Vol. 100. No. 4-6. pp. 170–177. With 1 plate.

This investigation has reference to 5 strains of *V. phosphorescens*, which were isolated during a cholera epidemic. Three of them were obtained from cases of typically clinical cholera in which no other vibrio was found. One was derived from a case of gastro-enteritis and another from the gall-bladder of a case of typhoid fever. Research is made, through morphological, biochemical, serological and immunological characters, to establish relationship between this vibrio, the phosphorescent vibrio of water, and *V. cholerae*. The cholera vibrio is not phosphorescent. There is little doubt, however, of the close relationship with the water vibrio, and there are somewhat striking direct and cross protective affinities with the cholera vibrio. The author's contention is that *V. phosphorescens*, a water vibrio, may be pathogenic to man in greater or less degree, so as to give rise on occasion to cholera or gastro-enteritis, and that man may become a true carrier of this organism.

W. F. H.

LAL (R. B.) & YACOB (M.). **The Relative Suitability of Certain Foodstuffs as Media for the Cultivation of** *V. cholerae* **with Special Reference to their Relative Rôle in the Dissemination of Cholera.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 245–255. With 1 text fig.

A fixed amount of serial dilutions of cholera emulsions is added to the various food stuffs, made up to uniform volume and then tested for growth in peptone solution or for number of colonies given by the highest dilution in Esch's medium.

W. F. H.

NOBECHI (Keizo). Sur la préparation du bactériophage pour le vibrion cholerique et la classification de ces vibrions au point de vue du phénomène de bacteriophage. [**Preparation of Cholera Bacteriophage. Classification of Vibrios according to Bacteriophage Characters.**]—*C.R. Soc. Biol.* 1926. Nov. 26. Vol. 95. No. 34. pp. 1250–1252.

Crossed experiments, in which 18 filtrates of bouillon cultures were placed, each with each, in contact with 18 strains of *V. cholerae*, showed that 3 of these were spontaneously lysogenic: they exhibited typical bacteriophage phenomena. Lysis began after about 3 hours and reached its maximum about the 4th or 5th hour. Thus it was essential to examine the cultures continuously from the beginning, as otherwise secondary growth masked the lysis. Three types emerged from the examination of these strains—6 resistant and non-lysogenic, 9 sensitive and non-lysogenic, 3 resistant and lysogenic. Absorption experiments showed that the sensitive strains took up bacteriophage while resistant did not.

W. F. H.

NOBECHI (Keizo). Sur la signification du bactériophage pour le vibrion cholérique. [**Importance of the Bacteriophage for the Cholera Vibrio.**]—*C.R. Soc. Biol.* 1926. Nov. 26. Vol. 95. No. 34. pp. 1252–1254.

Changes in the form of colonies of *V. cholerae* brought about by the action of the lytic principle are not permanent. Reversion takes place to the ordinary form after some passages in the media containing bacteriophage and at the same time the strain becomes resistant. The strains made resistant in this way become with subculture non-lysogenic. The strain developed is spontaneously agglutinable and gives a deposit in bouillon with perfectly clear supernatant fluid. The appearance then of the culture is such as would make one hesitate to call it *V. cholerae.* Colonies of the cholera vibrio thus developed, when sown on agar and kept without subculture, lose their spontaneous agglutinability.

Intraperitoneal inoculation in guineapigs of 0·3 to 0·5 cc. of bacteriophage culture protects the animal against 3 to 10 M.L.D. of a virulent culture. In every case Pfeiffer's phenomenon has been positive. But in those where treatment by bacteriophage did not protect the guineapigs the vibrios recovered P.M. were always of the resistant sort. Filtrates of cultures, both lysogenic and non-lysogenic, have only slight protective power.

W. F. H.

HAHN (Martin) & HIRSCH (Julius). Gewinnung und Prüfung von Choleragift. (II. Mitteilung.) [**Procural and Testing of Cholera Toxin.**]—*Klin. Woch.* 1927. Feb. 12. Vol. 6. No. 7. pp. 312–313. With 3 text figs. [1 ref.]

Toxin solutions lose potency in a few days. A stable dried toxin, killing a 250-gm. guineapig intraperitoneally in a dose of about 30 mgm. in 12 to 24 hours, was obtained. Purification by dialysis reduced the dose to 1–2 mgm. Subcutaneous injection also killed, although in 5 to 10 times the dose, with onset of symptoms after 24 hours incubation. The dried toxin, when tested upon isolated rabbit intestine produced, in concentration of 0·0006 to 0·02 per cent., shortening of the amplitude of contraction and eventually complete spastic paralysis.

W. F. H.

KABESHIMA (Tamezo). [**On a New "Kamanuki" Specific Medium for** *Cholera vibrio*, **Hemoglobin-Soda-Agar Medium.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1926. Aug. No. 2484. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. pp. 351–352.]

This medium can be simply prepared without any steam sterilization as follows :—

(1) Prepare a 3 per cent. solution of agar in tap water and boil for 1 hr. ; (2) Add to 80 cc. of the dissolved agar 2 gm. broth, 1 gm. peptone, 0·5 gm. sod. chloride and 18 per cent. crystalline sod. carbonate solution ; (3) cool the medium in water, shaking it all the while ; (4) add 3 gm. either Beufer or Shinoda's haemoglobin extract, dissolved in 10 cc. tap water, to the medium at 50° C. ; (5) make plates and dry in incubator.

W. F. H.

KO-RAN. Ueber den Typus der im laufenden Jahre beobachteten Cholerabazillen, und einige Versuche ueber Cholerarot-Reaktion. [**Current Types of** *V. cholerae* ; **the Cholera-Red Reaction.**]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. Dec. No. 261. German summary pp. 3–4. [In Japanese.]

The cholera vibrios isolated were atypical. For the cholera-red reaction a 0·25 per cent. peptone water of pH 7 was found the most suitable.

W. F. H.

YUI (C. Voonping). **A Few Practical Hints for the Clinical Diagnosis and Treatment of Cholera.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 765–773.

This is a general review of cholera emphasizing the need for early diagnosis at the beginning of an epidemic and describing treatment suitable for the different stages of the disease. If possible a cholera patient should be isolated as long as he is passing cholera vibrios [*v.* this *Bulletin,* Vol. 23, p. 613 (YUI)].

J. H. T. W.

# TROPICAL OPHTHALMOLOGY:

## A REVIEW OF RECENT ARTICLES.—VII.*

THE EYELIDS.—WRIGHT[1] recommends tarsorrhaphy to the general practitioner as a means of combating a harmful exposure of the cornea due to lid injury, leprosy, removal of the Gasserian ganglion, proptosis, etc. The small operation is simple and calls for no knowledge of plastic surgery; whilst it may often save an eye which otherwise would be lost.

CONJUNCTIVA.—FAHIM GIRGIS IBRAHIM[2] met with a number of cases of membranous conjunctivitis at Rod el Farag and at Suez during the second half of 1925. The average age of the patients was about one year, and as many as fourteen cases were in hospital at one time. In only 22 cases was the diphtheria bacillus demonstrated by culture. Most of these were of a mild type as only one eye was lost. Gonococci were found alone in smears taken from eight cases, and in association with the Koch-Weeks bacillus in one. From his experience of this epidemic of membranous conjunctivitis the writer concluded (1) that the degree of severity of the case is no guide as to the probable bacteriological findings, since sometimes the diphtheria bacillus may be found in mild cases and not in severe ones; and (2) that, owing to culture methods, or to the antiseptics used in treatment, bacilli, which show the morphological and cultural characteristics of diphtheria, may lose virulence and become non-lethal to guineapigs. When working in Madras the reviewer formed the opinion that the virulence of the diphtheria bacillus was lowered by the tropical climate, and that mild infections occurred there more commonly than was often supposed. Occasionally, when conditions were exceptionally favourable to the disease, a higher degree of virulence developed and more typical cases were encountered; but these were seldom so severe as those ordinarily met with in a temperate climate.

*Trachoma.* TABOURY[3] divides conjunctival inflammations which show cell inclusions into two classes: (1) Trachoma; (2) blenorrhoea neonatorum and swimming-bath conjunctivitis. Pannus and cicatrization are found in trachoma only. Both classes commence with an acute stage, and the inclusions disappear as the disease retrogresses. The presence of inclusion bodies in the cells of the limbus is pathognomonic of trachoma. LI[4] insists on the use of a loupe to examine the conjunctiva in the early stage of trachoma. Fine scars and any thickening of the membrane should be noted. [The injection of a syringeful of normal saline along the upper border of the tarsal plate will expose the fornix and render pathological changes more evident.] The onset of pannus in the upper region of the limbus is another sign to be looked for.

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* For the sixth of this series see Vol. 23, pp. 919–927.

[1] WRIGHT (R. E.). A Simple Method of dealing with Destructive Lesions of the Lids.—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 2. pp. 12–13.

[2] FAHIM GIRGIS IBRAHIM. Membranous Conjunctivitis.—*Bull. Ophthalm. Soc. Egypt.* 1926. pp. 55–59.

[3] TABOURY. The Question of Trachoma and its Agent.—*Harefuah.* Jerusalem. 1926. Oct.–Nov. Vol. 2. No. 1. English summary pp. V–VII. [In Hebrew pp. 312–328. With 3 text figs. Numerous refs.]

[4] LI (T. M.). The Early Diagnosis of Trachoma.—*China Med. Jl.* 1926. Nov. Vol. 40. No. 11. pp. 1083–1085.

FEIGENBAUM[5] states that in Palestine two-thirds to three-quarters of the trachoma found amongst adults is due to an infection contracted during the first three years of life. The mother is a special source of infection to her child. He considers the infectivity of trachoma to be less than is commonly supposed, and that probably a number of unfavourable circumstances, to which the poor are especially subject, must be simultaneously present in order to provoke an attack. Trachoma is particularly destructive when associated with secondary infections, and an antitrachoma campaign should therefore be directed against all infectious forms of eye disease. All methods of attack should be instituted simultaneously, the problem being chiefly one of social hygiene. But early treatment, energetically continued until the disease is cured, is required. The support of the teacher and of the trained District Nurse is necessary. The Hadasseh Medical Organisation has done much good work, and systematic school treatment has been carried out all over the country. In the Jerusalem schools active trachoma has diminished from a rate of 24·6 per cent. in 1914 to 11·5 per cent. in 1925. This reduction is all the more remarkable when the flow of immigrant infected children from the neighbouring countries (Persia, Kurdistan, Mesopotamia, etc.) is taken into consideration. The recurring epidemic of summer conjunctivitis causes an annual recrudescence of active trachoma. It is remarked that nasal disease aggravates trachoma; this adds yet another factor to be dealt with in the campaign against the complaint. SHIMKIN[6], also discussing the question of trachoma in Palestine, makes some further points. Since the disease prevails where there is much dirt and uncleanliness, it is rather more common in the Arab villages than in the towns, the sanitary conditions under which the Arab rural population lives being extraordinarily bad. The southern districts are more heavily infected than the northern. This is due to a lower rainfall, to a greater liability to conjunctival irritation by dust and sand from the desert, and to a poorer water supply. The summer epidemic of ophthalmia is largely caused by the Koch-Weeks bacillus. The author concludes that " the increase in the number of schools, particularly in the villages, combined with systematic treatment of the children attending them, appears to be the best means of dealing with trachoma in Palestine under present conditions. This is particularly applicable to the Arab population."

GRÖNHOLM[7] has twice investigated the disease as it occurs in Finland. On the first occasion in 1908 he was associated with E. KUHLEFELT and on the second in 1924 with HJELMANN. Some 170,000 persons were examined in all. Emigrants and inmates of schools, factories, prisons and workhouses furnished the material. He states that trachoma appears to have been rife in Finland for many years. It has been mentioned by writers in the middle of the eighteenth century; and in the first half of the nineteenth century at least half of the patients in the County Hospital at Vara were said to suffer from eye disease—mostly neglected ophthalmias. In 1908 5 per cent. of the population were found to be trachomatous, and in 1924 1·5 per cent. It is interesting to note that the incidence amongst school children was small and only amounted to 3·8 per cent. in 1908 and to 0·9 per cent. in 1924. Workhouse inmates during the same periods showed an incidence of 24 per cent. and 15 per cent. This experience is in marked contrast to conditions in North Africa, and in the Near East where the school-children have been reported by some observers to be very heavily infected. The disease in Finland was found to be considerably more common in women than in men (in the proportion of 138 women to 100 men). Investigation showed that the disease is on the decrease. But this decrease is not continuous, and from time to time occasional waves of exacerbation occur. It is suggested that fluctuations in the virulence of the contagion may be responsible for this phenomenon. The general decrease may be attributed to improved hygiene and general conditions. The stringent American immigration laws also have been of service since intending emigrants now realize that it is important to prevent or to cure the disease.

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[5] FEIGENBAUM (Arieh). Some Notes on the Problems and Results of the Jewish Campaign against Trachoma in Palestine.—*Arch. of Ophthalm.* 1926. Sept. Vol. 55. No. 5. pp. 453–460. With 2 graphs.

[6] SHIMKIN (N.). Trachoma in Palestine. Its Epidemiology and a Review of Measures for dealing with it.—*Brit. Jl. Ophthalm.* 1926. May. Vol. 10. No. 5. pp. 247–279. With 7 diagrams. [20 refs.]

[7] GRÖNHOLM (V.). The Occurrence of Trachoma in Finland formerly and at present.—*Acta Ophthalmologica.* 1925. Vol. 3. No. 1–2. pp. 1–11. With 2 maps & 3 charts.

How difficult the diagnosis of trachoma may sometimes prove is well demonstrated by a discussion between BOBBERT[8] and KOPSTEIN[9] regarding the prevalence of the disease in Ambon. The former found from 19 to 44 per cent. of the children in different schools affected. Only the mildest cases could be arrested after "a mechanical and intensively chemical treatment of some months." Whereas KOPSTEIN found comparatively few cases of trachoma, but observed a follicular catarrh, which tended to recover without cicatrization, to be fairly common. He remarks that entropion and trichiasis are seldom seen amongst the adult population, and that a high incidence of trachoma is therefore unlikely. Experienced observers well know how closely a follicular catarrh, which has been over treated by irritant applications, may resemble true trachoma. The discussion is useful as it draws attention to the danger of an over active treatment in conjunctival inflammations.

Surgeons practising amongst dark-skinned races fairly often notice the presence of pigment in trachomatous scars, and possibly some may attribute it to the application of "native medicines." HERSCHENDÖRFER[10] met with and carefully examined four cases of the condition and has discussed its probable cause. He is inclined to believe that the cellular tissue, blood, or lymph of such patients contains more chromogenic substance than is usual, and that the sluggish local circulation associated with scar formation affords an opportunity for oxydasis to occur and thus to give rise to pigmentation. MACCALLAN[11] advises that the conjunctiva should be painted daily with a 2 per cent. solution of silver nitrate in the early stages of trachoma. Should any coagulum or necrosis result, further paintings must be postponed until separation has occurred. Treatment must be continued for many months, and it is advisable from time to time to substitute cyanide of mercury 1 per cent., copper sulphate 10 per cent., or perchloride of mercury ·5 per cent. [It should be remembered that the long continued use of irritant applications, especially of silver nitrate, may prove harmful.] Expression should be performed when marked follicle formation occurs in the second stage, or combined excision if the case is complicated by spring catarrh. He recommends daily applications of 1 per cent. perchloride of mercury in the third stage when cicatrization has definitely begun and may be advanced. This may be alternated with a 10 per cent. solution of copper sulphate. Combined excision may prove helpful in this stage also.

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[8] BOBBERT (A. C.). On the most Frequent Eye-Diseases in Ambon (Trachoma).—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 483–484.

[9] KOPSTEIN (F.). Remarks on the Article by A. C. BOBBERT on the most Frequent Eye-Diseases in Ambon (Trachoma).—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 485–488.

[10] HERSCHENDÖRFER (A.). Pigment Changes in the Conjunctiva of the Lids in Trachoma.—*Amer. Jl. Ophthalm.* 1926. Nov. Vol. 9. No. 11. pp. 812–822. With 5 text figs. [17 refs.]

[11] MACCALLAN (A. F.). The Treatment of Trachoma.—*Lancet.* 1926. Oct. 30. pp. 919–920. [1 ref.]

Serotherapy is thought by SALVATI[12] to be of some value in the treatment of the disease. He considers that, possibly, its favourable influence may be due to the presence of a special antitoxin. The serum should be injected beneath the conjunctiva in order to obtain the best result. He uses a minimal dose of one-quarter of a cc., and states that the injections are quite painless and free from any reaction ; they can therefore be repeated every second day. [When estimating the effect of a treatment of this nature the observer must not lose sight of the fact that a simple injection of normal saline solution is often beneficial owing to the stretching of the conjunctiva and the lymphagogic action produced by it. An injection, too, renders it easy to apply drugs efficiently to the ballooned out membrane.]

NARÓG[13] tested the absorptive action of pepsin upon cicatrices of the lids, trachomatous pannus and leukomata of the cornea and obtained a positive effect. He found that a combination of the pepsin with a dilute acid rendered the drug more active. It is a little difficult to make out exact details of the technique from his description. Apparently a 1 per cent. solution of pepsin was combined with a ·3 per cent. solution of HCl and an equal quantity of novocaine and adrenalin solution was added to the mixture. This was injected directly into the cicatrices. The injection was repeated in from three to six days according to the amount of reaction elicited. Severe pain lasting for some hours is caused by a large dose. For this reason small doses are recommended.

DE LIEBERMANN[14] has published a further description of a method of lid fixation which he has found of special service in Blaskovic's operation of turning the tarsus in cases of cicatricial entropion caused by trachoma. He uses a broad, T-shaped spatula. The horizontal limb of the instrument is provided with three projecting knobs, or screws, to which threads can be readily fixed. One of these knobs is placed near each extremity of the limb and the third at the middle. Fine threads are passed, mattress fashion, 1 mm. from the lid margin. The thread is entered on the conjunctival surface, made to emerge through the skin, and re-entered at a point 2 mm. to the side of its exit. Three such sutures are used. The lid is everted upon the vertical limb of the spatula, and is drawn up taut and fixed in position by tying each double thread to its appropriate knob on the horizontal limb. The whole cicatrized tarsus is thus stretched out flat and can readily be dealt with.

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[12] SALVATI. La sérothérapie dans le trachome.—*Ann. d'Oculistique.* 1926. Aug. Vol. 163. No. 8. pp. 613–623. With 8 text figs. [4 refs.]

[13] NARÓG (Frank). Experimental and Curative Application of Pepsin in Eye-Diseases.—*Amer. Jl. Ophthalm.* 1926. Oct. Vol. 9. No. 10. pp. 746–751.

[14] DE LIEBERMANN (L.). Method of Thread Fixation of the Lid in Tarsus Operations.—*Arch. of Ophthalm.* 1926. Sept. Vol. 55. No. 5. pp. 461–464. With 1 text fig. [7 refs.]

*The Revue Internationale du Trachome* for October 1926 contains a description by AUBARET and MASTIER[15] of hyperplastic growths which they sometimes observed in eyes affected by cicatricial trachoma. In one case the greater portion of the growth was composed of masses of hyaline degenerative matter which failed to give an amyloid reaction. DE GRÔSZ[16] refers to the strenuous and successful work done by MACCALLAN and his assistants in Egypt and expresses the hope that the benefits of this work would not be sacrificed under the conditions now prevailing. MORAX[17] describes a case of trachoma affecting one eye only in a Corsican girl aged 18. The case was remarkable for its severity and. intractibility, and for the fact that the only source of infection appeared to be an infant who suffered from an eye disease the nature of which was unknown. AUBARET[18] presents the case of Marseilles with regard to the disease. This port, many of whose residents are already infected, is subject to a continuous invasion by trachomatous immigrants. The local resources are insufficient to cope with these. And he pleads that the State, in its own interest, should give financial assistance in order to deal efficiently with the plague. Elena PUSCARIU[19] recounts some of her observations in Roumania, and states she found that the eyes of those associated with trachomatous patients were seldom healthy. She recognizes three stages of the disease. In the first the changes are limited to the upper border of the superior tarsal plate and to the lower cul de sac. In the second ptosis appears and the membrane is swollen and more generally affected ; even the plica is thickened and the subject of vascular injection. The third stage is marked by the occurrence of cicatrization and its consequences. As regards secondary infections, 3·87 per cent. were caused by the Koch-Weeks bacillus, and in 86·6 per cent. unnamed micro-organisms were present. She states that she often found phlyctenular disease associated with trachoma. Emile JUNES[20] says that he found Koch-Weeks ophthalmia and purulent ophthalmia to be the two most destructive diseases of the eye in Sfax. They are often followed by trachoma and he suggests that they lower the resistance of the conjunctiva to that disease.

*Cornea.*—P. Chalmers JAMESON[21] recommends the use of a double triangular *conjunctival flap to cover a corneal wound.* A straight incision, starting at a point on the limbus which corresponds to the top of the vertical meridian of the cornea, is carried back directly to the fornix, and secondary circumcorneal incisions are then made from the same point on the limbus. The extent of these latter depends upon how much of the cornea it is necessary to cover. The flaps are next under-mined and raised from the globe. Two triangular flaps are thus fashioned whose apices correspond to the point on the limbus at which the first incision started. The apex of one flap is now drawn over the cornea and is sutured to the sclera at the point where the circumlimbal incision on the opposite side terminated. Two or three sutures may be required to hold the flap in place over the cornea. The second flap is next drawn over the one already placed in position, and is sutured to the conjunctiva at the limbus. The wound is thus covered by a double layer of membrane. The superficial flap usually retracts in the course of about three days and the deep one follows suit a little later. JAMESON frequently replaces a prolapsed iris by passing a spatula into the anterior chamber through a secondary incision, and then employing traction from within the chamber together with pressure on the cornea.

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[15] AUBARET & MASTIER. Végétations hypertrophiques et néoplasiques du trachome.—*Revue Internat. du Trachome.* 1926. Oct. Vol. 3. No. 4. pp. 123–128. With 2 text figs.

[16] DE GRÔSZ (Émile). La lutte contre le trachome en Egypte.—*Revue Internat. du Trachome.* 1926. Oct. Vol. 3. No. 4. pp. 129–130.

[17] MORAX (V.). Trachome unilatéral. Contamination de l'adolescence. Forme tenace.—*Revue Internat. du Trachome.* 1926. Oct. Vol. 3. No. 4. pp. 131–133.

[18] AUBARET. Organisation d'un centre antitrachomateux.—*Revue Internat. du Trachome.* 1926. Oct. Vol. 3. No. 4. pp. 133–138.

[19] PUSCARIU (Elena). Le trachome.—Etude clinique. Symptomes. Formes cliniques. Affections associées. Evolution, durée, pronostic. Diagnostic.—*Revue Internat. du Trachome.* 1926. Oct. Vol. 3. No. 4. pp. 141–158. With 2 text figs.

[20] JUNES (Emile). Six années d'oculistique et de lutte antitrachomateuse au dispensaire de la croix rouge de Sfax.—*Revue Internat. du Trachome.* 1926. Oct. Vol. 3. No. 4. pp. 168–172.

[21] JAMESON (P. Chalmers). The Surgical Treatment of Wounds of the Cornea with Prolapsed Iris.—*Arch. of Ophthalm.* 1926. Sept. Vol. 55. No. 5. pp. 465–469. With 5 figs. on 2 plates.

E. WOLFF[22] has recorded two cases of *lime burn of the cornea* which he successfully treated by the application of a 10 per cent. solution of neutral ammonium tartrate. Preliminary cocainization is necessary if the eye is injected. The freshly prepared solution of neutral ammonium tartrate is instilled slowly from an undine for about 15 minutes every day. He states that even cases of long standing may be benefited by the treatment which should be continued for a long period. The insoluble calcium carbonate appears to be converted into the slightly soluble calcium tartrate. The treatment rather reminds one of that recommended by ELLIOT[23] for lead incrustation of the cornea. Here the leukoma is scraped and the denuded surface is flushed with a strong aqueous solution of sulphuretted hydrogen.

*Cataract.*—Conrad BERENS and Ray R. LOSEY[24] believe that conjunctival suturing is a safeguard against many of the complications encountered in cataract extraction, and they have described a technique which they claim is free from the disadvantages of the suture as ordinarily employed. A continuous circumcorneal suture of waxed silk is used ; each extremity of this is placed in the horizontal meridian of the globe, at a point 8 mm. from the limbus, and is left untied. Seven bites of bulbar conjunctiva are picked up by the suture. Two of these are placed on each side, parallel and close to one another, in such a way as partially to fix each end of the thread ; one is situated close to the limbic attachment of the conjunctival bridge flap ; one lies on the nasal side 8 mm. from the cornea and 8 mm. from the vertical meridian, whilst another lies is a similar position on the temporal side.

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[22] WOLFF (E.). The Treatment of Lime-Burns of the Cornea by 10 per cent. Neutral Ammonium Tartrate.—*Brit. Jl. Ophthalm.* 1926. Apr. Vol. 10. No. 4. pp. 196–197. [4 refs.]

[23] ELLIOT (R. H.). A Case of Lead Opacity of the Cornea treated by the Application of a Solution of Sulphuretted Hydrogen.—*Ophthalmoscope.* 1911. Vol. 9. pp. 498–499.

[24] BERENS (Conrad) & LOSEY (Ray R.). An Untied Conjunctival Suture and Conjunctival Bridge in Cataract Extraction. Results and Conclusions.—*Brit. Jl. Ophthalm.* 1926. Nov. Vol. 10. No. 11. pp. 577–591. With 7 text figs. [31 refs.]

The conjunctiva is first buttonholed by a narrow-bladed scissors at a point 8 mm. above and 8 mm. temporal to the upper end of the vertical meridian of the cornea in the case of the right eye, or at a similar point on the nasal side in the case of the left eye, and the membrane surrounding the upper quarter of the cornea is undermined. The first three insertions of the suture are then made, a long loop being left between the first and second insertion. The section is next performed and care is taken to fashion a wide conjunctival bridge which is left temporarily attached. The suture is now completed by passing it through the bridge and three times through the bulbar conjunctiva as described above. The conjunctival pier of the bridge is then divided and the lens delivered. After the delivery of the lens and the toilet of the wound have been effected the wound is closed by pulling on the loop. The ends of the suture are drawn taut and are held in place on the nose and on the temple by means of collodion. Many surgeons having Eastern experience are likely to regard somewhat doubtfully the use of any form of suture in cataract extraction. Its employment adds a complication to the operation and introduces a possible source of sepsis or irritation. Cases in which the support of a suture is likely to be required may often be dealt with by the use of a conjunctival bridge which is free from these objections. It must be admitted that the use of a bridge flap renders lens delivery and other manipulations rather more difficult. But difficulties disappear if proper counter-pressure is employed and little care is exercised. Preliminary iridectomy and capsulotomy with a Bowman's needle immediately before making the section are steps which render extraction beneath a conjunctival bridge flap easier and safer.

Strother SMITH[25] has made some helpful notes on ophthalmic work. Regarding cataract, he deprecates any prolonged preparation of the patient for the operation as he thinks such may produce a loss of control in a nervous person. Unnecessary directions should be avoided and the patient on no account should be told to look downwards whilst the lens is being expressed in the course of an intracapsular operation. He insists upon the danger of prolonged, purely medicinal treatment of glaucoma. He lays down a most valuable maxim which should be taken to heart by every tyro : " Don't overdo the treatment of chronic trachoma [or any other form of conjunctival inflammation] by applying strong solutions of silver nitrate or pure copper sulphate too often."

Occasionally the Indian coucher may adopt a rather elaborate procedure. NARAYANA RAO[26] saw a patient who had undergone some preliminary treatment by a hakim. On the first visit the coucher instilled some drops and inserted a conjunctival suture of ordinary thread with a sewing needle. This suture was tied and left long. Three subsequent daily visits were paid, and at each of these drops were instilled and some medicine applied to the skin around the eye. On the fourth day the lens was couched, a cloth being held over the heads of patient and coucher during the operation. Possibly the suture may have been used to fix the globe during couching and the instillations have been made for the purpose of disinfection. The use of the cloth, however, suggests that the whole ritual was intended to impress the public.

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[25] SMITH (F. F. Strother). A Few " Don'ts " in Ophthalmic Work.—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 531–533.

[26] NARAYANA RAO (B. K.). A Curious Preliminary " Treatment " for Couching for Cataract.—*Indian Med. Gaz.* 1926. Sept. Vol. 61. No. 9. p. 446. With 1 text fig.

Henry SMITH[27] says he has found subconjunctival extraction, stitched conjunctival flaps, and corneal stitches all to be inefficient as a means of preventing iris prolapse. He has tried with some success the effect of making three small peripheral iridectomies before expressing the lens in its capsule. These are placed at ten, twelve and two o'clock respectively. He gives a dose of 80 to 100 grains of potassium bromide the night previous to operation in order to lessen the risk of squeezing as he thinks the induction of orbicular paresis by novocaine injections may predispose to eversion of the corneal flap. He considers it advisable to postpone excision of a prolapse until twelve or fourteen days after the extraction has been performed.

CRUICKSHANK[28] has made careful notes upon 82 cases of iritis which occurred within ten days of operation among 1,250 cataract extractions performed at Shikapur. He concludes that the complication mostly resulted from the retention in the chamber of protein matter belonging to the blood plasma or to the crystalline lens. And that such inflammation is more likely to occur in individuals who are specially sensitive to protein. It is interesting to note that the iritis appears to have been almost as often associated with retention of blood as it was with retention of capsule and cortex. CRUICKSHANK has not discussed in his paper the possible influence of any associated bacterial infection as a contributing cause of the iritis. It is difficult entirely to eliminate this factor; and it is conceivable that a low grade infection, such as would be easily repelled by the tissues under ordinary circumstances, might obtain a foothold if the local resistance was lowered by the presence of blood clot or lens cortex.

BANAJI[29] says that after a personal experience of 800 intracapsular operations performed after Smith's method, he reverted to capsulotomy. He formed the opinion that panophthalmitis, secondary glaucoma, detachment of the retina, and late infections occurred with greater frequency after Smith's operation. He administers 60 grains of calcium lactate daily on the two days preceding operation and 20 grains on the day of operation. If high blood-pressure, diabetes or glaucoma are present, 2 cc. of haemoplastin is injected an hour before operation. Should the surgeon have the slightest misgiving regarding the possibility of infection, 10 cc. of boiled milk is injected immediately after operation into the outer side of the thigh as a precautionary measure.

JAVA[30] states that intravenous injections of tincture of iodine have proved satisfactory in some of his cases of purulent infection of the wound after extraction of cataract. He uses 5 minims of tincture of iodine in 5 cc. of distilled water.

TEWFIK[31] has given some useful hints to beginners on the subject of cataract extraction. He stresses the importance of preliminary examination and treatment. He paints the conjunctiva of his patients two hours before operation with a 2 per cent. solution of silver nitrate as a routine measure. He recognizes the value of a sufficiently large section. But he deprecates the use of a conjunctival bridge flap since he thinks it interferes with the delicacy of the operation.

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[27] SMITH (Henry). The Treatment of the Iris in Cataract Operations.—*Arch. of Ophthalm.* 1927. Mar. Vol. 56. No. 2. pp. 105–109.

[28] CRUICKSHANK (M. M.). Iritis following Cataract Extraction.—*IndianMed. Gaz.* 1926. Oct. Vol. 61. No. 10. pp. 490–493. [7 refs.]

[29] BANAJI (B. P.). Avoidance of Post-Operative Infection in Cataract Operations.—*Brit. Jl. Ophthalm.* 1927. Feb. Vol. 11. No. 2. pp. 75–78.

[30] JAVA (K. G.). Notes in Ophthalmic Practice.—*Indian Med. Gaz.* 1927. Feb. Vol. 62. No. 2. p. 84.

[31] TEWFIK (M.). Some Hints on Senile Cataract Extraction Operation.—*Bull. Ophthalm. Soc. Egypt.* 1926. pp. 66–73.

In the experience of most surgeons operations for the relief of a secondary cataract following an extraction may sometimes prove troublesome and may not always achieve the desired aperture. The technique described by J. M. WHEELER[32] seems rather alarming at first sight; but the reviewer can testify as to its safety and efficacy when employed by its originator. Whilst the patient looks downwards, a special, short, narrow-bladed, and very sharp knife is passed through the cornea, 1 mm. from the limbus, and across the chamber until its point reaches the opposite edge of the dilated pupil. The surgeon then thrusts his hand, which holds the knife, and forearm straight forward, so that the knife, pivoting between his thumb and first finger, sweeps across the chamber and emerges at the site of entry. The knife-point thus passes along an arc of a circle and the blade delivers a true drawing cut. The speed at which the cut is made overcomes the yielding of an elastic membrane. Essential features are: (1) The knife should be held *very lightly* two inches from its point; (2) no overlapping of the pulps of the forefinger and thumb round the handle of the knife must be permitted. Such overlapping would interfere with the free action of the blade by limiting the pivot action at the place where the handle is held. Exactly the same technique may be employed in performing an iridotomy. In this case the incision is planned to divide transversely any drawn up fibres of the iris. The size of the aperture may be limited by holding the knife a little closer to its point.

*Glaucoma.*—MADAN[33] has reported the case of a woman, aged 55, who developed an acute glaucoma in a myopic eye following the continuous application of an ice-bag during thirteen days for a slight injury. He attributes the onset of glaucoma to an interference with the local circulation.

*General Diseases.*—

*Malaria.*— S. POPOVA[34] has recorded some of the ocular complications observed by him amongst his malarial patients in Turkestan. A superficial keratitis was the most common. Retinal haemorrhages occurred in a case of severe malignant tertian fever. He states that the various complications commenced soon after the attacks of fever, but were rarely seen during the actual attack, and that they usually terminated favourably.

*Smallpox.*—In a review of the ocular complications found in smallpox, DE ANDRADE[35] states he found the limbus to be the most common seat of vesicle formation in the eye. The edges of the lids require very careful cleansing and antiseptic eyewashes and ointments should be used. Of the latter a 2 per cent. picric acid ointment was found valuable.

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[32] WHEELER (J. M.). Secondary Cataract Opening by Single Straight Incision. Iridotomy by same Method.—*Trans. Amer. Acad. of Ophthalm. & Oto-Laryn.* 1924. Vol. 29. pp. 149-158.

[33] MADAN (K. E.). The Effect of Prolonged Application of Cold on the Eye.—*Indian Med. Gaz.* 1926. Dec. Vol. 61. No. 12. pp. 600–601.

[34] POPOVA (S.). Maladies des yeux dans la fièvre paludéenne d'après les données de la clinique Ophtalmologique de l'Université de l'Asie Centrale.—*Jl. Méd. de l'Asie Centrale.* Taschkent. 1926. July. Vol. 5. No. 7. pp. 405–414. [11 refs.] [In Russian.]

[35] DE ANDRADE (Gabriel). Complicações oculares da variola.—*Brasil-Medico.* 1926. Nov. 20. Year 40. Vol. 2. No. 21. pp. 287–289. [9 refs.]

*Leprosy.*—MARÍN AMAT[36] remarks how frequently alopecia is met with in leprosy. He found colour blindness quite common, and often met with fibrillary contraction of the orbicularis whilst he rarely saw paralysis of the muscle. The sclerotic was chiefly affected in the neighbourhood of the limbus. He states that large lepromata tend to attack the periphery of the iris.

*Amoebiasis.*—LLOYD MILLS[37] considers that an unsuspected amoebiasis may be sometimes the cause of chronic recurrent ocular disease, such as iridocyclitis, episcleritis, primary and secondary glaucoma, choroiditis, and conjunctivitis. He relies upon the beneficial effect of emetine following the discovery of the presence of the parasite to support his theory.

*Ankylostomiasis.*—LITTLE[38] reports a case of *double optic neuritis* for which he could find no cause other than the existence of a hookworm infection. The patient, a soldier, suffered from severe headache and vomiting. The blood changes were very slight, and the Wasserman reaction was negative. Consecutive atrophy occurred ; but the vision recovered from light perception to 6/24 in each eye. Whilst it must be admitted that improvement followed the expulsion of the parasites, one hesitates to accept ankylostomiasis as the sole cause of the neuritis.

*Miscellaneous.*—To render painless a blind, painful eye, without sacrificing the organ, is a service even more appreciated by a patient belonging to a backward community than by one whose lot is cast in a more civilized country. Optico-ciliary neurectomy is not always entirely satisfactory, and the use of *retrobulbar injections of alcohol* as described by JAENSCH[39] may find a place in the practice of eye surgeons in the tropics. He claims to have obtained a good result in 27 out of 29 cases. Thirteen of his patients suffered from primary glaucoma and 16 from secondary glaucoma ; and all were of long standing. Grüter's technique was employed. After anaesthetizing the eye, a special curved needle is entered beneath the conjunctiva and pushed round the globe until its point lies at the posterior pole of the eye. 1 cc. of 70 per cent. alcohol is then injected. Two separate injections are made, one being entered in the lower and inner quadrant, and the other in the upper and outer. Some paresis or paralysis of the ocular muscles occurred occasionally, but these symptoms never lasted longer than three months. Pain is experienced for a few seconds, but numbness comes on after half a minute.

*Drug idiosyncracy* in a patient subjected to an eye operation may prove troublesome and disconcerting. Atropine irritation is, of course, that most commonly observed by the eye surgeon. M. M. EL BAKRY[40] found in a patient whom he trephined a hypersensitiveness to mercuric chloride lotion 1 in 5,000. Two days after irrigation with the lotion a condition resembling erysipelas of the face developed. The eye was unaffected and the attack subsided in the course of five days. In another patient, operated on for trichiasis, a papular eczematous rash appeared. This proved to be caused by iodine. BAKRY found that, in these cases, the skin alone was affected and that the mucous membranes of the gums and cheek displayed no abnormal sensitiveness to the drugs.

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[36] MARÍN AMAT (Manuel). Contribución al estudio de la lepra ocular.—*Siglo Méd.* 1926. Sept. 18, 25 & Oct. 2. Year 73. Vol. 78. Nos. 3797, 3798 & 3799. pp. 257–261 ; 284–287 ; 310–314. With 4 text figs. [26 refs.]

[37] MILLS (Lloyd). Ocular Disease occurring in the Course of Nondysenteric Amebiasis.—*Jl. Amer. Med. Assoc.* 1926. Oct. 9. Vol. 87. No. 15. pp. 1176–1182. [23 refs.]

[38] LITTLE (J. P.). A Case of Optic Neuritis, caused presumably by *Ankylostoma duodenale* Infection.—*Jl. Roy. Army Med. Corps.* 1927. Jan. Vol. 48. No. 1. pp. 61–63.

[39] JAENSCH (P. A.). Die retrobulbäre Alkoholinjektion nach Grüter. Klinische Beobachtungen und experimentelle Untersuchungen.—*Ztschr. f. Augenheilk.* 1925. Vol. 58. pp. 1–11. [7 refs.]

*Ophthalmomyiasis.*—ZEEMAN[41] has described an eye removed from a boy in Zutphen owing to the occurrence of a destructive inflammation. Examination revealed that the inflammation was due to penetration of the globe by a dipterous larva. The iris showed spots of atrophy, the vitreous body was shrunken, the retina was detached and was perforated on the temporal side. Beneath the detached retina lay the spined and segmented body of a dipterous larva which measured 6 mm. by 1·5 mm. It was possible to identify a gut and two tracheae.

Favourable reports have been made from time to time regarding the use of *Besredka's bouillon-vaccine* in the conjunctival inflammations of man. NICOLAS[42] has extended its application to veterinary work with excellent results. The bouillon-vaccine, which is a broth freed of the micro-organisms (staphylococci, streptococci, pneumococci) which have been cultivated in it, is instilled thrice daily in the case of superficial ocular inflammations. In iridocyclitis it acts better when injected subconjunctivelly. In choroiditis and in panophthalmitis NICOLAS uses injections into the anterior chamber. He considers the beneficial action of the broth in cases of ocular infection, especially those of traumatic origin, to be undoubted.

FLEURY[43] has reported a case of a *cysticercus in the vitreous humour* of a Brazilian—a native of Tieté. The movements of the head could be easily seen with the ophthalmoscope. The cysticercus was successfully extracted and the diagnosis was confirmed by pathological examination.

*Reports.*—Report of the Eye Clinic Mulago (Uganda). Dr. OWEN[44] remarks upon the prevalence of trachoma in the district. No cases of interstitial keratitis or of disseminated choroiditis were seen, and senile cataract and glaucoma were comparatively rare.

H. Kirkpatrick.

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[40] EL BAKRY (M. M.). Description of Two Cases of Idiosyncrasy.—*Bull. Ophthalm. Soc. Egypt.* 1926. pp. 80–82.

[41] ZEEMAN (W. P. C.). Ophthalmomyiasis subretinalis.—*Nederl. Tijdschr. v. Geneesk.* 1926. Sept. 11. 70th Year. 2nd Half. No. 11. pp. 1192–1197. With 7 figs. on 1 plate.

[42] NICOLAS (E.). Prévention et traitement des infections oculaires des animaux à l'armée française du Levant par les bouillons-vaccins de staphylocoques et streptocoques associés.—*Ann. Inst. Pasteur.* 1926. Dec. Vol. 40. No. 12. pp. 1075–1079. [1 ref.]

[43] FLEURY (Gastão). Provas biologicas realizadas em um caso de cysticercose ocular.—*Brazil-Medico.* 1926. July 31. Year 40. Vol. 2. No. 5. pp. 61–62. [1 ref.]

[44] OWEN (H.B.) Report on the Eye Clinic for 1925. *Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1926.* pp. 77-78.

# RABIES.

## *International Rabies Conference.*

The International Rabies Conference convened by the Health Organization of the League of Nations met in Paris from May 25th to 30th, 1927. The meetings were held, at the Pasteur Institute, which by the courtesy of the French Officials had been offered for the purpose. It was peculiarly fitting that nearly fifty years after PASTEUR conducted his initial experiments on rabies, those who had carried his methods into all parts of the world should render an account of their stewardship in his own laboratory. Some sixty delegates were present, collected from all nations and speaking many tongues.

The Conference was opened by Professor ROUX, and addresses were delivered by Professor MADSEN on behalf of the League of Nations, and by Professor CALMETTE. The terms of reference had been carefully considered and published in book form. Copies had been circulated amongst the delegates. Professor MARIE wrote a chapter on the Nature of the Virus, and another on Methods of Treatment, Dr. REMLINGER on Paralytic Accidents, and Professor VALLEE on Canine Rabies. It was decided that the subject matter under discussion should be considered under these four heads, and their discussion was relegated to four commissions. These met at different times, so that each meeting could be attended by all delegates.

The Presidents of the first commission were BORDET (Brussels) and KRAUS (Vienna); of the second, MCKENDRICK (Edinburgh) and BUJWID (Krakow); of the third, PFEIFFER (Breslau) and ZLATOGOROFF (Kharkew); of the fourth, DI VESTEA (Pisa) and KITAJIMA (Tokio). The second and third sections were subsequently amalgamated. Meetings were held morning and afternoon throughout the week, and at the closing meeting the following resolutions were unanimously adopted.

### RESOLUTIONS ADOPTED BY THE FIRST COMMISSION.

### NATURE OF THE RABIC VIRUS.

" 1. The Commission considers that the rabic virus is a filterable virus; the difficulties sometimes experienced in the filtration are, in its opinion, due to the clogging of the ' bougies ' by fatty globules contained in the emulsion of nervous tissue and to the small size of the pores of the filters.

" 2. The Commission, after examining the microscopic preparations presented by Prof. Levaditi and Manouelian does not consider it desirable to pass an opinion as to the nature of the virus and decide whether it is a protozoon or a bacterium.

" It does not consider itself in a position to decide whether negri bodies represent a stage in the evolution of a living micro-organism or are produced by cellular reaction or degeneration."

### RESOLUTIONS ADOPTED BY THE SECOND AND THIRD COMMISSIONS.

" The Conference, having considered the results obtained by the various methods of anti-rabic treatment now employed in the different Institutes represented at the Conference and the advantages and disadvantages of each, have arrived at the following conclusions:

" 1. There is unanimity of opinion regarding the efficiency of Pasteur treatment by the original dried cord method and by the glycerinated cord method of immunization.

"2. It is also agreed that living fixed virus injected under the skin is innocuous to man in the vast majority of cases; in exceptional circumstances, however, it may be infective. For this reason, certain Institutes have adopted the use of a dead or attenuated vaccine. Such vaccines killed or attenuated either by carbolic acid or ether produce a satisfactory immunity.

"3. The etiology of paralytic symptoms which have, in rare cases, been observed as a sequel of antirabic inoculations, have been fully discussed and the experiences of the different Institutes regarding this matter have been compared.

"In the present stage of our knowledge it is not possible to make definite assertions as to the etiology of these phenomena.

"Among predisposing causes, alcohol, syphilis, neuropathic constitution, cold, fatigue, and overwork are important.

"The symptoms have been most commonly observed in persons of between 20 and 60 years of age, belonging to intellectual professions. Cases have been relatively rare among the indigenous races of tropical countries, and among children.

"Such paralytic accidents are less frequent if glycerinated or carbolized vaccines be employed.

"The brain of every human case that has died of intercurrent disease, during or shortly after the termination of treatment, should be examined for the presence of street or fixed virus. Such examinations are specially important if the case has exhibited paralytic symptoms.

"4. Opinion is equally divided as to the necessity of submitting to anti-rabic treatment persons whose skin has come into contact with the saliva of a rabid animal (or human being suffering from hydrophobia), if there be no visible break in the continuity of the skin surface. The great majority of the Conference are agreed, however, as to the necessity of treatment whenever a mucous membrane is contaminated in this manner.

"5. The Conference recommends that comparative tests on a large scale be carried out in certain selected Institutes with vaccines killed by carbolic acid and ether; other methods might subsequently be tested in similar manner.

"6. The Conference recommends that enquiries be made into the plurality of strains of street and fixed virus, and into the rabicidal action of the serum of man and animals during and after immunization.

"Special interest attaches to the detailed investigation of strains of street virus in cases where, in spite of apparently slight risk, treatment fails.

"7. The Conference requests the Health Organization of the League of Nations to consider the possibility of organizing the investigations described in paragraphs 5 and 6, and of arranging for the collection and distribution to the various Institutes of the world of information relating to rabies.

"8. The League's Health Organization is requested to arrange with one or more Institutes that preliminary investigations be carried out with the object of supplying all anti-rabic Institutes with a strain of fixed virus of high protective value.

"9. It is desirable also that the different Institutes should send, from time to time, their own strains of fixed virus to a specially selected Institute for comparative tests.

"It is further recommended that anti-rabic Institutes should examine at regular intervals the strains of fixed virus in use to ensure that their virulence has undergone no modification.

"10. The Health Organization of the League is invited to publish statistics of the results of anti-rabic treatment in the different anti-rabic Institutes of the world. To this end every Pasteur Institute should send each year its statistics tabulated according to a schedule to be drawn up by the Health Organization. Each Institute should report its *total* mortality. In this connexion it is desirable that each Institute should follow the after history of its patients for at least six months, and whenever possible, for a period of one year after the termination of treatment; the co-operation of the local authorities should be enlisted for this purpose. Each Institute should intimate what it has been able to do regarding this matter.

"Each Institute should analyse the *total* mortality with regard to the following factors:

"(*a*) Species of biting animal;

"(*b*) Evidence of rabies in biting animal (Categories A, B, C, D);

"(*c*) Whether the infection was due to deep or superficial lesion, or whether there was no visible lesion;

"(*d*) Bitten through bare skin or clothing;

"(*e*) Position of bite (head, arm, trunk, legs); (multiple bites to be classed according to the site of greatest danger);

"(*f*) Interval between bite and commencement of treatment: under four days; four to seven days; over seven days.

"Any change in the method of treatment should be reported. All paralytic accidents should likewise be reported with full details, whether such accidents prove fatal or not.

"Separate statistics should be supplied for patients treated in Institutes and for those treated outside."

## FOURTH COMMISSION.

### VACCINATION OF ANIMALS.

"In spite of the importance of the results already acquired in the study of anti-rabic vaccination of the various animal species, and the large number of animals already successfully vaccinated, the Conference does not consider that it is in a position to propose important changes in sanitary legislation. Nevertheless, the Conference considers it desirable that:

"Dogs be given prophylactic vaccination against rabies; such vaccination, as far as possible, should consist of a single inoculation of a dead killed virus (still capable of conferring immunity), or of a fixed virus, modified or not, which is not pathogenic to the dog when inoculated subcutaneously or intramuscularly.

"This prophylactic vaccination should be repeated each year.

"Such vaccination—at least in the beginning—should be applied in Pasteur Institutes, schools of veterinary medicine or by the local veterinary authority concerned.

"The administrative supervision should be such as to provide for the enumeration of vaccinated dogs and their inspection by a veterinary authority at the end of the fourth month following vaccination.

"All administrative supervision may be relaxed after a sufficient number of dogs have been properly vaccinated.

"The employment of vaccination among dogs exposed to infection should, in suitable cases, permit of relaxation of the sanitary regulations, and that measures applied to bitten animals should be graded as follows: Dogs bitten by animals known to be rabid shall be destroyed even if previously vaccinated. Dogs which are only suspected of having been bitten may be vaccinated on condition that they be isolated for six months.

"Prophylactic curative vaccination of cats should never be employed."

### OTHER ANIMALS.

"*It is desirable* that prophylactic vaccination of animals other than domestic carnivora be practised only in areas where rabies is particularly prevalent. In such vaccination the virus should be either a killed virus (still capable of conferring immunity) or a modified or unmodified fixed virus.

" Vaccination after the animal has been bitten is recommended. In such vaccination the vaccines used should be those indicated in the preceding paragraph. Such vaccination should be given during the four days following the bite, or at the latest before the tenth day.

" Animals bitten by rabid animals, whether treated or not after the bite, should not be butchered between the eighth day and, at the very least, the end of the third month following the bite.

" In the opinion of the Conference the only measures that will completely eradicate rabies are, the restriction of the liberty of the dog, unless muzzled, to the premises of the owner, and the destruction of the ownerless dog. The Conference recommends that these measures be embodied in the legislation of the various countries."

The value of these conclusions will be obvious to all who have studied recent literature regarding rabies. Difficulties have been swept away, new lines of research have been suggested. The activities of the Health Organization of the League have been invoked, with the object of conducting elaborate, comparative tests of various sorts, of ensuring that the strains of fixed virus in use throughout the Pasteur Institutes of the world will be maintained at a standard efficiency, and of publishing statistics of the results of antirabic treatment in the different Institutes, collected and tabulated on a uniform basis.

A. G. McKendrick.

# MISCELLANEOUS.

BALDWIN (Horace S.) & CECIL (Russell L.). **The Rationale of Specific Therapy in Pneumococcus Pneumonia.**—*Jl. Amer. Med. Assoc.* 1926. Nov. 20. Vol. 87. No. 21. pp. 1709–1715. With 9 charts in text. [18 refs.]

When bacteraemia (septicaemia) develops in the course of infections which are originally localized, the prognosis becomes grave. This is exemplified in the case of staphylococcus, streptococcus, and meningococcus infections. Fatal cases are nearly always complicated by bacteraemia. Pneumococcus pneumonia exemplifies the same facts.

Immunity in the case of the pneumococcus is of a highly specialized kind and extends to the different types of pneumococcus. Type I immunity is of little avail against other types. Again the pneumococcus itself develops a substance which is neutralizing to specific antibody and this substance is rigidly specific for type.

Fatal cases of pneumococcus pneumonia are characterized by the high incidence of bacteraemia. Thus among 37 cases with positive blood culture 29 died, whereas only 7 died of 70 cases with negative blood culture. Toxaemia may occur sometimes, even with high content of blood in protective substances, but the great majority of patients developing these substances recover. A high protective content of blood and bacteraemia rarely occur together. Therefore it may be affirmed that presence of protective substances in the blood constitutes a favourable prognostic sign. The test of protective blood substance is made upon mice, which are very susceptible to pneumococcus infection.

Do these facts encourage attempts at specific serum therapy?

In monkeys specific serum injected intravenously quickly clears the blood of organisms and has been able to save animals receiving lethal doses of pneumococci, even when the serum has been injected 72 hours after the micro-organism. Early administration however is all-important for success. The efficacy has been greatest for Type I infections, but has also been good in the case of Type II.

In man there is good reason to suppose that specific therapy is a sound form of therapy. The sterility of the blood can be brought about in man by the use of antiserum. But it does not follow that this sterility is all that is required: "The serum of a patient with pneumonia, even when the blood is sterile, may contain a substance that has high absorptive power for homologous protective bodies. It may be assumed that this neutralizing substance is the S substance of Avery and Heidelberger." One of the difficulties in the way of satisfactory specific therapy in man is the necessity for injection of large amounts of the foreign serum. Progress in this form of treatment would seem to lie along the lines of being able to obtain sera of high antibody content and as free as possible from foreign protein.

W. F. Harvey.

MILLER (L. E.). **Treatment of Pneumonia amongst Natives by Sodium Nucleinate.**—*S. African Med. Rec.* 1926. Dec. 11. Vol. 24. No. 23. pp. 531–532.

The author has treated 117 cases of pneumonia in Mine natives with intramuscular injections of sodium nucleinate, 87 lobar pneumonia and 30 broncho-pneumonia, with case mortalities of 8·04 and 13·3 respectively. Of lobar pneumonia patients 24 had a crisis on the 2nd day after injection and 18 on the 3rd day. He thinks these results sufficiently promising to justify the continuation of this treatment so that a conclusion as to its value may be reached. The method was employed by Dr. Gardner MEDWIN in influenza cases to induce leucocytosis. In the majority of Miller's cases there was already a leucocytosis and 24 hours after the sodium nucleinate injection the leucocyte count was increased by 7,000 to 9,000. The dose is 0·1 gm. in solution in 2 cc. ampoules. If the temperature did not come down in 48 hours the dose was repeated. Sodium bicarbonate also was given in half-drachm doses every 4 hours in severe cases, and expectorants and stimulants were employed when indicated.

A. G. B.

BHATTACHARYYA (N.). **A Brief Note on the Morphology, Cultural Characters and Biochemical Reactions of** *Vibriothrix zeylanica* **Castellani.**—*Jl. Trop. Med. & Hyg.* 1926. Nov. 15. Vol. 29. No. 22. pp. 371–374. With 9 text figs. [8 refs.]

The organism is highly polymorphic and may present bacillary, spirillar and spirochaetal forms. It is not considered to be etiologically related to dysentery although isolated from the stools of dysentery cases. The chief characters to be noted are that it is non-pathogenic to animals, highly motile, Gram-negative, a filter passer, incapable of fermenting sugars and non-liquefying.

W. F. H.

KOJIMA (S.). **On the Differential Diagnosis of** *Bacilli Typhosus, Paratyphosus, Dysenteriae, Cholerae,* **and** *Coli.*—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 383–385.

Detection of organisms of the typho-dysentery group is effected by the use of Endo and Drigalski-Conradi media. Certain modifications of these are made, such as substitution of brom-thymol blue for litmus, reduction of fuchsin sulphite and lactose constituents to give better differentiation between *B. typhosus* and *B. coli*, adjustment of pH and omission of crystal violet from the medium in the case of dysentery. For the diagnosis of cholera, peptone water, Dieudonné, and Aronson's media are used.

W. F. H.

MAZZA (Salvador). Vaccin polyvalent et vaccin monovalent dans le traitement spécifique du chancre mou et du bubon. [**Polyvalent and Monovalent Vaccines in the Specific Treatment of Soft Chancre and Bubo.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 157–162.

Professor Mazza reports results obtained in the treatment of eight cases of chancroid in Buenos Aires by means of a polyvalent vaccine prepared by NICOLLE and DURAND in Tunis from the streptobacillus of DUCREY, and a monovalent vaccine prepared by himself.

He shows that only those cases which give a positive dermal reaction with a virus emulsion yield satisfactory results when treated with the corresponding vaccine ; in other words when using a stock vaccine,its polyvalency must be as great as possible as there would appear to be para-forms of the organism or at least a number of different strains. These difficulties overcome, the treatment gives remarkable results in both cases of soft chancre alone and those with buboes. The vaccine is given intravenously at about 3 days' interval. Improvement is seen within 24 hours of the first treatment and complete healing occurs often after 3 or 4 injections, but it is essential to continue these until complete healing is effected otherwise relapse may occur.

H. S. Stannus.

Ross (I. Clunies). **An Experimental Study of Tick Paralysis in Australia.**—*Parasitology.* 1926. Dec. Vol. 18. No. 4. pp. 410–429. With 2 text figs. [48 refs.]

In Australia tick paralysis is a serious consequence of tick-bite to which domestic animals and man himself are liable. This important paper, describing diversified experimental observations of tick paralysis in the dog—an animal that appears to be particularly susceptible—goes a long way in explaining the nature of the phenomenon.

It appears that in Australia tick-paralysis is communicated only by the mature female of *Ixodes holocyclus* and by her only at a particular time of her life, namely, in the two days before she drops from the host upon which she is gorging. It is then that her salivary glands, which have become enormously hypertrophied, are surcharged with a venomous secretion that contains coagulins.

The paralysis is not communicable by inoculation of blood or cerebrospinal fluid or nerve-tissue of affected hosts, nor by injection of the contents of the body of a tick taken from an affected host, neither have any pathogenous organisms been discovered in the fluids or organs of affected animals. It must follow, therefore, that the salivary secretion (like that of the Thanatophidia) is self toxic—but only at a particular term of life, since in dogs the onset of symptoms has not been observed before the lapse of 5 days from the attachment of ticks, and paralysis has never been observed when ticks are detached from a dog before the lapse of the usual interval for appearance of symptoms. Again, an emulsion of the glands is toxic.

The interval that elapses between the attachment of the tick and the first signs of paralysis is not to be apprehended as an "incubation period" in the host : it is evidently a physiological period proper to the tick herself.

A single tick may cause fatal paralysis in man or dog. The paralysis is progressive and death appears to take place through paralysis of respiration. There is some evidence that immunity may be acquired after recovery. There is no evidence of tick-paralysis being under any seasonal influence.

Although tick-paralysis is communicated by the adult female of *Ixodes holocyclus* only, the immature stages of this species are by no means innocuous in other ways.

A. Alcock.

DONATH (W.F.), MENGERT-PRESSER (H.) & OUDENDAL (A. J. F.). **The Iron-Percentage of Liver, Spleen, Kidneys and Blood of the Native Inhabitants, ascertained according to the Chemical Analytical and to the Histo-Chemical Methods.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 3. pp. 163–277. With 70 figs. [89 refs.]

This is an elaborate and very painstaking piece of research into the occurrence, distribution and causation of haemosiderosis in man in the tropics. The work was carried out at the Medical School, Weltevreden, Dutch East Indies.

There is a short introduction, followed by a paper on the histochemical examination of liver, spleen, and kidney for the presence of of iron pigment by Oudendal. Then follow papers by Donath on the chemical analysis for iron in certain organs of the body and in the blood of man, and by Mengert-Presser on the haemoglobin content of the human blood in the tropics.

These researches originated from observations made at postmortems on Javanese and Chinese dying of various causes. In practically every case crystals, which proved to be iron compounds, were detached in the kidneys, liver, and spleen. The problems these authors attempted to solve were :—

(1) How did the iron content of the liver, spleen, kidney, and blood compare in healthy Europeans living in Europe with those residing in the Tropics, and with healthy natives ?

(2) What effect had such diseases as malaria, amoebiasis, bacillary dysentery, beri-beri, and tuberculosis on the iron content of such organs ?

(3) What was the origin of the iron found : was it derived from ingestion in water or food, or from haemolysins produced by the agency of micro-organisms, toxins, or sunlight ?

*Iron content of liver, spleen and kidneys.*—

The iron was detected in liver, spleen, and kidneys histologically by staining with Turnbull's method, and it was found by comparison with chemical analysis that the depth of blue colour produced in the tissues by this stain was proportionate to the percentage of contained iron. The chemical analysis for iron was carried out by a slight modification of Newmann's technique ; the blood being left in the organs. The material examined was derived from 266 necropsies in the Dutch East Indies, and from 19 post-mortems in Holland by VAN ITALLIE.

The results showed that there was a marked increase of the iron content of these organs in the commoner chronic and wasting diseases (tuberculosis, dysentery, ankylostomiasis, malaria, diabetes and cancer) both in the tropics and in Europe. Thus the normal average iron content for a healthy European liver is about ·005 per cent. (HUECK) ; whereas the average amount of iron found in 266 cases of wasting diseases in the tropics was for liver ·0206 per cent., spleen ·0486 per cent., and kidneys ·011 per cent., and in the 19 cases of wasting disease in Europe the average iron content was for liver ·0225 per cent., spleen ·0523 per cent., and kidneys ·007 per cent. The amount of iron in each organ was found to vary with the disease, the individual, and with the combination of two or more diseases. There was no typical iron distribution for any disease, but the highest iron percentages for the kidneys were obtained in cases of pneumonia and in malaria. The organs in amoebiasis showed a higher iron content than in cases of bacillary dysentery.

The distribution of the iron in these organs was not constant—some areas contained iron, others were free. Moreover, the iron occurred either in form of fine granules or larger masses. In the liver the iron was situated chiefly towards the periphery of the lobules, due perhaps to the slower circulation in this region. In some instances it was confined to the line of the portal tracts in such a way as to suggest a pre-cirrhosis of the liver. The type of cell containing the pigment varied; at times it was found equally in liver parenchyma and in Küpffer's cells, at other times only in liver cells, or in Küpffer's cells. The lymphatic removal of iron pigments from the liver was suggested by the occurrence of these compounds in the lumen, endothelial lining and walls of efferent lymphatics, and in the adjacent lymphatic glands. The siderosis of the spleen ran parallel to that of the liver ; thus the pigment was found chiefly in the endothelium lining the sinuses, in the trabeculae which were fibrotic, and at times in the sinus contents, but the follicles usually escaped. Lymphatic removal of the pigment was seen in the perivascular lymphatics and in those of the capsule, leading to thickening of the capsule and adhesions.

In the kidneys the iron pigment was found to occur chiefly in the epithelial cells of the convoluted tubules ; these pigment containing cells desquamated and thus the iron was transported to the lumen of the straight tubules, where it formed conspicuous iron casts which at times caused anuria (c.f. Blackwater fever). The glomeruli were normal.

Interesting animal experiments bearing on the above were performed. Monkeys were fed on rice containing bamboo hairs which, being pointed at both ends, penetrated and remained in the mucosa or submucosa of the gut and caused minute haemorrhages. In this manner a considerable haemosiderosis was produced in spleen, liver, and kidneys within a period of even a week. These results strongly suggested an explanation for the haemosiderosis found in men dying from such diseases as ankylostomiasis, amoebiasis, and intestinal tuberculosis. Experiments were carried out on white rats by exposing them to sunlight, but protecting them from direct solar radiation ; these animals died as a result of this treatment and there was a marked increase of the iron content of their livers, spleens, and kidneys. Thus the exposure of man to solar influences in the tropics may lead to an increase of iron compound in the body. But this does not appear to play an important part, as the analysis of these authors' figures referred to above shows as high an iron content in the organs of men dying of wasting diseases in Europe.

*The haemoglobin and iron content of the blood in the tropics* was investigated by means of the methods of Sahli and Lapique respectively. Preliminary experiments in the estimation of haemoglobin percentages by Sahli's method proved that a certain correction had to be made for the temperature at which the test was carried out. In addition, it was shown that the haemoglobin and iron content of the blood taken from any given case was similar whether it was collected from the lobe of the ear, finger, or by vein puncture. It was found that sojourn in the tropics caused an increase in the haemoglobin and iron content of the blood of healthy Europeans ; whereas, all chronic wasting diseases tended to produce a varying degree of anaemia, the haemoglobin and iron being decreased in more or less proportionate amounts ; the greatest decrease occurred in amoebiasis and pulmonary tuberculosis.

RESULTS EXPRESSED IN AVERAGES.

| | Haemoglobin percentage. | Iron Content. mgm. per 10 cc. blood. |
|---|---|---|
| Healthy— | | |
| Natives ... ... ... ... | 104 | 6·199 |
| Europeans ... ... ... | 97 | 5·84 |
| Diseases— | | |
| Beri-beri... ... ... ... | 91 | 4·719 |
| Malaria ... ... ... ... | 76 | 4·334 |
| Leprosy ... ... ... ... | 72 | 4·049 |
| Amoebiasis ... ... ... | 71 | 3·849 |
| Pulmonary tuberculosis ... | 63 | 3·314 |
| Healthy Europeans in Europe ... | 90 | 4·5 |

Curves were worked out to demonstrate the effect of sunlight and direct solar radiation on the haemoglobin and iron content of the blood. Rats and monkeys exposed to such influences showed a period of haemoglobin decrease during the first week of treatment, followed thereafter by a steady and continued rise in the percentage of blood haemoglobin and iron. Similar results have been recorded by SPANUTH, in Roumania, for convalescents from malaria treated by sunshine. FREI and ALDER obtained similar phenomena with guinea-pigs exposed to the effects of Röntgen rays.

Harold E. Whittingham.

FRIMODT-MÖLLER (C.). **Further Observations on Sanocrysin Treatment of Indian Patients.**—*Jl. Christian Med. Assoc. of India.* 1926. Sept. 18 pp. [6 refs.]

This reports follows on a previous paper in which eight cases of pulmonary tuberculosis were recorded as treated by sanocrysin up to November 1925. In the present communication the author deals with a total of 32 patients, including those previously reported. This paper has a unique importance in that it deals with Indian patients of a racial type notorious for a tendency to severe and progressive disease; and the good results obtained are, by so much, the more significant.

Dr. Frimodt-Möller, like most of those who have tried sanocrysin in this country, has taken to smaller doses, and a longer interval, than originally advocated by the Danish clinicians. Even with the careful methods of administration employed, several of his cases exhibited disagreeable symptoms and this even when a series of gradually increasing doses had already been well tolerated. In Case No. 22, for instance, up to the seventh injection all had been well; but on the eighth, consisting of half a gram of sanocrysin, a dose which had been well tolerated a week before, transitory albuminuria appeared, stomatitis and dermatitis developed and a very disagreeable condition of buccal ulceration persisted for several months. As a matter of fact, the lung condition steadily improved and the treatment was decidedly valuable to the patient; but the case illustrates the fact that one is never quite safe with sanocrysin and that personal idiosyncrasies may reveal themselves in the shape of "metallic poisoning," of varying degree at any time and in any patient. The reviewer could supply from his own experience several parallel instances of "toxic" phenomena suddenly arising at a moment when all seemed to-be going well. But the fact remains that sanocrysin is so definitely favourable in its action on the majority of suitably selected cases that the physician is thoroughly justified in giving it a careful trial provided that he can ensure to his patients the necessary constant care and supervision during treatment.

Frimodt-Möller works on the following lines: The initial doses are in most cases 10 or 12·5 centigrammes. The following doses (when an increase is indicated) are usually 25, 37·5, 50 and 75 centigrammes, with 1 gramme as a maximum in those cases which reach the highest doses. The course of treatment has consisted of from 8 to 12 injections, spread over from two to four months. The average total amount given per case was 3 grammes; the maximum 4·6 grammes. Of the 32 cases treated, one very "early" case is excluded from consideration as inconclusive and 4 are cut out because still under treatment. Of the remaining 27 cases, 13 or 48 per cent. were much improved, 6 or 22 per cent. improved and one case was not influenced either way. In 7, the treatment had to be interrupted as the patients were unable to tolerate sanocrysin. Tubercle bacilli disappeared from the sputum in 6 out of 17 cases and pyrexia, if present, tended to cease. The author lays stress on the risk attaching to this form of treatment if not carried out with the greatest caution and recommends that it should only be given where the patient is assured of constant supervision in a well-staffed hospital.

S. L. Cummins.

MUELCHI (Adeline F.). **Magnesium Sulphate in the Treatment of Tetanus Neonatorum. Report of Case.**—*Amer. Jl. Dis. Children.* 1926. Sept. Vol. 32. No. 3. pp. 393–395. [5 refs.]

BRATUSCH-MARRAIN has reported a series of 36 cases of tetanus neonatorum at Graz. To 28 patients in the first group magnesium sulphate was not given and there was only one survival; 7 of the 8 patients of the second group had magnesium sulphate and 4 recovered. Antitoxin was given both intraspinally and subcutaneously and 2 5 cc. subcutaneous injections of a 4 per cent. solution of mag. sulph., then once daily, and afterwards on alternate days. The injections bring about enough relaxation to permit the infant to nurse and time is given to the body to combat the disease. The case here described was that of a negro baby aged 26 days. Tetanus set in on the 10th day. Antitetanic serum was given on the 16th day, a total of 11,500 units. Two doses of a 10 per cent. solution of mag. sulph. controlled the convulsions. Recovery was uneventful.

A. G. B.

BERETERVIDE (Enrique A.) & DE LARA (Francisco). Absceso hepâtico en un niño de 11 años. Curación. [**Abscess of the Liver in a Boy, 11 years of Age. Cure.**]—*Semana Méd.* 1926. Sept. 2. Vol. 33. No. 35. (1703). pp. 592–594.

The patient, a poorly-nourished boy of 11 years, had suffered from middle-ear disease. He was suddenly seized with a rigor and acute pain in the right hypochondrium. When examined 20 days later there was a rounded swelling the size of an orange in the lower hepatic region, acutely tender. Puncture revealed pus from which a Streptococcus was grown in pure culture. Operation was forthwith carried out and the abscess evacuated; the temperature fell to normal the following day and convalescence was uneventful. The author could find no cause other than the ear trouble to which the abscess could be attributed.

H. Harold Scott.

CAMERON (A. T.) & NICHOLSON (D.). **An Improved Mode of Expression of Haemoglobin Values.**—*Canadian Med. Assoc. Jl.* 1926. Nov. Vol. 16. No. 11. pp. 1336–1339. [11 refs.]

Since, as WILLIAMSON has shown, normal values of haemoglobin of the blood vary greatly with age, especially up to 16 years, and after that with sex, the authors consider that haemoglobin values can be most accurately reported in plus or minus percentages of the average normal value of the particular age and sex, and they include in this paper a table of variations of haemoglobin with age and sex and a table of mean normal values of haemoglobin based on Williamson's smoothed curve. Values within plus or minus 20 per cent. must be regarded as within normal limits.

TABLE I.

VARIATIONS OF HAEMOGLOBIN WITH AGE AND SEX.

| Age. | Males. | | | | Females. | | | |
|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Mean | Percentage Variation from Mean. | Min. | Max. | Mean | Percentage Variation from Mean. |
| Days. | | | | | | | | |
| 1 ... ... | 18·7 | 26·7 | 23·3 | —20—+15 | 20·3 | 27·3 | 23·1 | —12—+18 |
| 2–3 ... ... | 18·9 | 25·7 | 22·5 | —16—+14 | 20·6 | 26·2 | 23·0 | —10—+14 |
| 4–8 ... ... | 16·8 | 28·4 | 22·0 | —24—+29 | 19·3 | 24·9 | 22·1 | —13—+13 |
| 9–13 ... ... | 18·9 | 25·3 | 21·3 | —11—+19 | 18·3 | 26·1 | 21·3 | —14—+23 |
| Months. | | | | | | | | |
| 0·5–2 ... | 11·1 | 25·7 | 18·7 | —41—+37 | 12·8 | 22·6 | 18·0 | —29—+26 |
| 3–5 ... ... | 10·5 | 16·5 | 13·1 | —20—+26 | 12·6 | 15·8 | 14·2 | —11—+11 |
| 6–11 ... ... | 8·0 | 15·8 | 13·2 | —39—+20 | 11·2 | 16·4 | 14·2 | —21—+15 |
| Years. | | | | | | | | |
| 1 ... | 9·1 | 15·5 | 12·9 | —29—+20 | 7·8 | 16·6 | 12·2 | —36—+36 |
| 2 ... | 9·4 | 14·4 | 12·4 | —24—+16 | 10·6 | 14·0 | 12·8 | —17—+ 9 |
| 3 ... | 11·6 | 15·0 | 13·2 | —12—+14 | 11·1 | 15·3 | 13·1 | —15—+17 |
| 4 ... | 11·1 | 14·7 | 13·3 | —17—+11 | 12·0 | 16·0 | 14·0 | —14—+14 |
| 5 ... | 11·8 | 15·4 | 13·8 | —14—+12 | 11·6 | 14·8 | 13·2 | —12—+12 |
| 6–10 ... | 13·4 | 15·8 | 14·6 | — 8—+ 8 | 11·8 | 15·4 | 13·8 | —14—+12 |
| 11–15 ... | 12·1 | 16·3 | 14·5 | —17—+12 | 12·7 | 15·9 | 14·9 | —15—+ 7 |
| 16–20 ... | 14·2 | 19·4 | 16·8 | —18—+18 | 13·7 | 17·1 | 15·7 | —13—+ 9 |
| 21–25 ... | 15·0 | 18·8 | 17·2 | —13—+ 9 | 13·6 | 16·8 | 15·0 | — 9—+12 |
| 26–30 ... | 14·2 | 18·2 | 16·4 | —13—+11 | 14·0 | 17·8 | 15·6 | —10—+14 |
| 31–35 ... | 15·1 | 20·3 | 16·9 | —11—+20 | 13·2 | 17·6 | 15·4 | — 8—+ 8 |
| 36–40 ... | 15·5 | 18·7 | 16·9 | — 8—+11 | 12·1 | 18·1 | 15·3 | —21—+18 |
| 41–45 ... | 15·3 | 18·5 | 16·9 | — 9—+ 9 | 14·4 | 17·8 | 15·6 | — 8—+ 8 |
| 46–50 ... | 15·1 | 19·5 | 17·1 | —12—+14 | 12·9 | 17·9 | 15·5 | —17—+15 |
| 51–55 ... | 14·5 | 20·1 | 15·9 | — 9—+26 | 13·7 | 17·7 | 16·1 | —15—+10 |
| 56–60 ... | 15·2 | 18·6 | 17·0 | —11—+ 9 | 14·2 | 17·0 | 15·8 | —10—+ 7 |
| 61–65 ... | 15·2 | 18·8 | 16·4 | — 7—+ 8 | 14·5 | 17·9 | 15·7 | — 7—+14 |
| 66–70 ... | 14·7 | 18·7 | 16·1 | — 9—+10 | 13·0 | 17·6 | 15·6 | —17—+13 |
| 71–75 ... | 13·6 | 17·4 | 15·2 | —11—+14 | 13·0 | 17·8 | 15·4 | —16—+16 |
| Over 75 ... | 13·9 | 17·3 | 15·7 | —11—+10 | 12·7 | 17·1 | 15·1 | —16—+13 |

TABLE II.

Haemoglobin Content of the Blood of Infants.

| No of. Cases. | | Age. | Extreme Values. | Average Value. | Value from Williamson's Chart. |
|---|---|---|---|---|---|
| 1 | ... | 8 hours | ... | 21·5 | 23·2 |
| 3 | ... | 15, 18, 21 hours | 21·3—24·0 | 22·3 | 23·2 |
| 5 | ... | 2–3 days | 20·1—22·8 | 21·6 | 22·7 |
| 8 | ... | 4–10 days | 19·6—23·3 | 22·3 | 22·1 |

TABLE III.

Mean Normal Values of Blood Haemoglobin.

| Age. | Haemoglobin in grams. per 100 cc. blood. | | Haemoglobin in per cent. (100 per cent. 16·9 grams per 100 cc.). | |
|---|---|---|---|---|
| | Males. | Females. | Males. | Females. |
| Birth ... ... ... | 23·2 | 23·2 | 137 | 137 |
| 2 days ... ... | 22·7 | 22·7 | 134 | 134 |
| 4 ,, ... ... | 22·4 | 22·4 | 133 | 133 |
| 6 ,, ... ... | 22·1 | 22·1 | 131 | 131 |
| 10 ,, ... ... | 21·4 | 21·4 | 127 | 127 |
| 20 ,, ... ... | 20·1 | 20·1 | 119 | 119 |
| 1 month ... ... | 19·0 | 19·0 | 112 | 112 |
| 2 months ... ... | 16·2 | 16·2 | 96 | 96 |
| 4 ,, ... ... | 13·6 | 13·6 | 80 | 80 |
| 6 ,, ... ... | 13·4 | 13·4 | 79 | 79 |
| 9 ,, ... ... | 12·9 | 12·9 | 76 | 76 |
| 1 year ... ... | 12·6 | 12·6 | 75 | 75 |
| 1·5 year ... ... | 12·4 | 12·4 | 73 | 73 |
| 2 years ... ... | 12·6 | 12·6 | 75 | 75 |
| 3 ,, ... ... | 13·1 | 13·1 | 78 | 78 |
| 4 ,, ... ... | 13·5 | 13·5 | 80 | 80 |
| 5 ,, ... ... | 13·7 | 13·7 | 81 | 81 |
| 7·5 ,, ... ... | 14·1 | 14·1 | 83 | 83 |
| 10 ,, ... ... | 14·4 | 14·4 | 85 | 85 |
| 12·5 ,, ... ... | 14·7 | 14·7 | 87 | 87 |
| 15 ,, ... ... | 15·4 | 15·0 | 91 | 88 |
| 17·5 ,, ... ... | 16·5 | 15·3 | 98 | 91 |
| 20 ,, ... ... | 16·8 | 15·4 | 99 | 91 |
| 30 ,, ... ... | 16·9 | 15·4 | 100 | 91 |
| 40 ,, ... ... | 16·9 | 15·4 | 100 | 91 |
| 45 ,, ... ... | 16·9 | 15·4 | 100 | 91 |
| 50 ,, ... ... | 16·9 | 15·7 | 100 | 93 |
| 60 ,, ... ... | 16·6 | 15·9 | 98 | 94 |
| 70 ,, ... ... | 15·9 | 15·4 | 94 | 91 |
| 80 ,, ... ... | 15·7 | 15·1 | 93 | 89 |

A. A.

Radsma (W.). **A Contribution to the Knowledge of the Chemical Composition of the Blood in the Inhabitants of the Tropics.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* pp. 1025–1046. [16 refs.]

The observations here recorded were carried out in the Dutch Indies by the most recent and trustworthy methods, and data are presented mainly in tabular form relating to water-content, haematocrit-values, sugar, non-protein nitrogen, urea and cholesterol content of the blood. The result can be most briefly put, namely, that no definite difference could be detected between the chemical composition of the blood in the tropics as compared with that in Europe and America. This is contrary to certain statements which have been published on this question.

W. D. Halliburton.

ROMERO SIERRA (J. M.). Estudio sobre la sangre humana en Caracas. [**Study of Human Blood in Caracas.**]—*Gac. Méd. de Carácas.* 1926. Sept. 15. Vol. 33. No. 17. pp. 257–266. [31 refs.]

The author carried out examinations on the blood of 17 apparently normal adults in Caracas, and states that the conditions found were different from what obtains in temperate zones on the one hand, and from the findings of KOP in the tropics on the other.

[For the purpose of establishing a normal for the district, uncontrolled examinations such as this are, one is sorry to have to say it, valueless, in spite of the large amount of rather tedious work involved. To give but one or two reasons: In the detailed accounts of the 17 cases every one without exception is stated to have shown anisocytosis; the haemoglobin (which was estimated by Tallqvist's method only) varied between 100 and 60 per cent.; the red cells between 3,600,000 and 5,700,000 per cmm.; the colour index between 0·58 and 1·3; eosinophiles up to 17·9 per cent. In view of these great variations it does not surprise us to find the author stating at the end of his paper that " for greater exactitude it would be well to precede the examination of the blood by an investigation for parasitic infestations."]

H. Harold Scott.

EGGERS (H.). Das menschliche Blutbild im Hochtal von Mexiko. [**The Blood Picture of Man in the Highlands of Mexico.**]—*Muench. Med. Woch.* 1926. May 7. Vol. 73. No. 19. pp. 779–781. [2 refs.]

The blood-picture in the highlands of Mexico is characterized by a great increase in the number of red blood corpuscles [as has been observed also in Himalayan altitudes]. In the Mexican mountain dwellers their number is increased to 7¼ millions per cubic mm., and the haemoglobin to 111 per cent. Other characteristic features are leucopenia and relative lymphocytosis, and monocytosis. This leucocytosis of adaptation begins within the first 3 weeks of arrival. In healthy persons the adaptive changes in the blood are quickly consummated by large and rapid gradations. The failure or delay of adaptive changes in the blood is conducive to " mountain sickness." The author emphasizes the importance, for diagnostic purposes, of the study of the blood phenomena at high elevations where, as in Mexico, there may be a considerable population.

[The author does not make any reference to an interesting paper on *Blood Observations at High Altitudes and Some Conclusions . . . in Relation to Mountain Sickness*, by R. W. G. HINGSTON, published in the *Records of the Survey of India*, Vol. vi, 1914.]

A. A.

# REVIEWS AND NOTICES.

RAVAUT (Paul) [Médecin de l'Hôpital Saint-Louis.] Syphilis, Paludisme, Amibiase. Notes de thérapeutique pratique. **[Syphilis, Malaria, Amoebiasis. Notes on Treatment.]** Préface du Professeur Fernand WIDAL. 3rd Edition.—284 pp. 1927. Paris: Masson et Cie, 120 Boulevard Saint-Germain. [22 fr.]

Mankind is scourged by syphilis, malaria and amoebiasis. There are resemblances of a kind between these diseases. Two are of unquestionable protozoan origin and all are characterized by varying chronicity and clinical relapse. Certain preparations of arsenic are of prime value in the treatment of one, and not without some beneficial effect on the patient in the other two. The resemblances hardly go further. They are stressed mostly by those who appear not to have studied all three equally closely. Dr. Ravaut is not of this group of impressionists. A distinguished syphilologist, his accurate first-hand studies of amoebiasis (he was the first to demonstrate amoebic dysentery in Northern France in 1915), and of malaria, have equipped him to set out in one volume, side by side, the essentials of treatment in these three diseases, and ensure for him the interested and respectful attention of his colleagues. He insists on the necessity of repeated courses of treatment after the apparent cure of the primary attack in all three. In syphilis arsenobenzol must be combined with bismuth treatment, in malaria quinine with arsenobenzol, and in amoebiasis emetine with arsenobenzol. In amoebiasis Dr. Ravaut first introduced arsenobenzol treatment per os and showed its great value in that disease; the experience of many others has subsequently confirmed this. In this book are clearly given detailed instructions for variations of dosage of the several drugs, methods of administration, and repetition of courses of treatment, in each type of case usually met with in syphilis, malaria and amoebiasis—diseases which provide the main bulk of tropical medical practice.

H. M. Hanschell.

HURRY (Jamieson B.) [M.A., M.D.]. **Imhotep. The Vizier and Physician of King Zoser and afterwards the Egyptian God of Medicine.**—pp. xvi+118. With 17 illustrations. 1926. Humphrey Milford: Oxford University Press. [7s. 6d.]

This interesting and artistic piece of work, of which only 73 pages treat directly of Imhotep, is a sort of fantasia of nicely blended movements on two predominant themes—Ancient Egyptian Medicine and The Hero as Divinity, where the hero is not of the bold invincible type, but of the peaceable patient kind working wonders with pharmacology and irresistible spell.

To Imhotep the mortal contemporary of King Zoser the author gives 24 pages. But "unhappily, we know nothing of his early history. No glimpse is allowed us of his birthplace or early childhood; there is no record of his appearance in the flesh, nor is anything told us of the steps by which he reached the highest post open to an official in Egypt." All that seems certainly known is that he belonged to an architect caste, that he was Grand Vizier as well as Chief Physician and Chief of the Works to a Pharaoh of the 3rd Dynasty named Zoser (*circa* 2980 B.C.), and that he also had other interests in life. For lack of discoverable fact the author gives us some more or less relevant surmise based on the known duties and responsibilities of the offices held by Imhotep, or on records in which his name appears incidentally. Of his doings as Vizier all that we are told here is that he made a very guarded reply when King Zoser in the difficulties of a prolonged famine asked his advice about propitiating the tutelar deities of the sources of the Nile; but if the surly sinister countenance depicted in the well-executed plate facing p. 4 be a life-like portrait of the King we can imagine that the chief officer of State must have had to bear some very sorrowful burdens. As Chief of the Works, he " in all probability " designed the terraced-pyramid—the destined tomb for the monarch —near Memphis, which stands to this day. As " Magician-Physician " we are told that he had an immense reputation, but also that " unhappily nothing is known of his special work as a physician," though " the important office of vizier must have added prestige to his name and inspired confidence in his patients." With regard to his other interests in life, he was Chief Lector Priest, he perhaps was interested in astronomy and astrology, and—like some great Ministers of State to-day—he was eminent in the literary field. In course of time, Imhotep was gathered to his fathers, was buried no one really knows where (" probably in the desert just outside the city of Memphis "), and was forgotten for a long time.

About thirteen hundred years afterwards, however, the spectre of Imhotep appeared among the Egyptian demigods. This enormous interval—equal to that which separates us from the Heptarchy—is of itself suggestive of some flaw or twist in the course to true deification. A demigod should preservė some show of attachment to an earthly abode, or —like John Nicholson among the people of Bannu—should be acclaimed in his lifetime. This obvious abnormality is here admitted, since it is stated that the story of the hero was " worked up " from records discovered by a priest named Nechautis, who had an eye to an appointment as high-priest of Imhotep " with power to bequeathe that position to his posterity " —an appointment for which he felt himself well qualified. The author gives 9 pages and 3 plates to the demigod Imhotep and his votary Nechautis, and informs us in a footnote that—as might be expected—documents have been discovered that assign a much earlier date to the demigodhood.

More than 2,700 years after Imhotep had shuffled off his mortal coil as Grand Vizier—at a time when Egypt had become a Persian province, and was beginning also to feel the sway of Hellas—he appeared in full glory among the gods of the Egyptians. It has been suggested that this exaltation was due to Hellenic influence, and, in fact, the resident Greeks of Egypt identified him with Aesculapius, and they and their successors under the Ptolemies, as well as the Greeks and Romans of Hellenistic times, commonly worshipped him under that name. The author devotes 32 interesting pages, illustrated by 10 fine plates, to the cult and images and temples of Imhotep after his apotheosis. The temple at Memphis, known to the Greeks as the Asclepiion, became " a famous hospital and school of magic and medicine." Of the temple at Philae, built in the period of the Ptolemies and bearing a dedicatory inscription to Aesculapius over its door, some beautiful ruins still exist, and are here artistically represented.

The author fills the mighty void in the earthly life-history of Imhotep with some remarks on magic and a brief essay on ancient Egyptian Medicine, the latter being compiled from ancient Egyptian documents, portions of which in turn were—or may have been—compiled from still older documents that were contemporaneous with Imhotep; he also makes some references to the well-known appreciation by the Greeks of the skill of Egyptian doctors and the value of their pharmacology. But of Imhotep himself there is nothing to tell—no methods, no pupils, no tradition, no personal touch—" he is said to have produced works on medicine and architecture as well as on more general subjects "; as he " was court physician to King Zoser . . . evidently he moved in the highest social circles "; he " enjoyed a high reputation both as magician and as physician "; it is " his eminence as a healer of the sick that has given him imperishable fame and that led eventually to his deification." Therefore when the author proceeds to make of this shadowy human figure an almost profanely substantial "Dr. Imhotep," rather "inclined to the scientific side of medicine," a man to be held in everlasting remembrance and reverence by physicians all the world over "as one of the pioneers of their ancient profession," one is rather inclined to wonder whether he is quite serious in his imploration.

A. Alcock.

JOURNAL OF THE BURMA RESEARCH SOCIETY. 1925. Dec. Vol. 15. Part III. pp. 171–267. With 13 plates. And 1926. Dec. Vol. 16. Part III. pp. 166–245. With 12 plates (3 maps), 2 curves & 1 text fig. Published by the Society. 1926. Feb., and 1927 Jan. Rangoon: Printed at the British Burma Press.

The Journal of the Burma Research Society is published three times a year. Until lately it seems to have dealt chiefly with history and the arts, but in 1925 the Society determined that one of the three annual publications should be devoted to science. The Society would thus appear to have taken inspiration to some extent from the Asiatic Society of Bengal, which for nearly 150 years (ever since its foundation in 1784 by the great Oriental scholar, Sir William JONES) has steadily endeavoured to keep all the works of Nature in Asia, and all the imaginative and material productions of the Oriental intellect, within its horizon. In these present days of restricted specialism, however, the attempt so to hold the gorgeous East in fee is less hopeful than it was in the old cheerful days of the pioneers.

In their range, which includes geology, botany, zoology and parasitology, as well as mechanics applied to bridge-building and to hydro-electric developments, and in their plane of execution these first two scientific volumes of the Burma Society are yet of good augury.

Of these diverse subjects, however, only zoology and parasitology can be brought within our purview. In systematic zoology a paper, by G. E. GATES, on the results of a survey of the earthworms of Rangoon is full of information; among other things we learn, incidentally, that in Burma earthworms charred to ashes form an important (and ingenious) ingredient of tooth powder, that one sort of worm-soup is used as a remedy for headaches, and another sort for weakness after child-birth, that earthworms cooked in the grease of gecko lizards are one of the ingredients of an aphrodisiac reputed to be exceedingly potent, and that the liquor decanted from roasted earthworm-castings shaken in water is "very cool medicine for hot stomach." There are five papers on Parasitology—two dealing with Cestodes, two with Trematodes, and one with the larva of an Acanthocephalous worm infesting the Rangoon toad—all contributed from the local University. The two first—respectively entitled *The Tapeworms of the Domestic Fowl*, and *A List of Cestodes collected in Burma 1923–1926*—are by Dr. F. J. MEGGITT, the Director of the Biological Department of the University, who explains that Burma is peculiarly opulent in material for this rather lugubrious branch of study. "The majority of animals dissected contain at least a single specimen, usually many; freedom from infection is extremely rare"; fowls being more heavily infected than any other kind of animal. The List of Cestodes contains the names of 71 species collected from 99 species of animals (mammals, birds, reptiles, amphibia and an annelid). The two papers on Trematodes are by Mr. BHALERAO; in one of them 3 new species and 5 new varieties are described as the spoil from six specimens of a bat (*Nyctinomus plicatus*); the other gives a list of 28 species of Trematodes recorded from Burma, with their several hosts.

A. Alcock.

HEARLE (Eric). **The Mosquitoes of the Lower Fraser Valley, British Columbia, and their Control. Report of Work carried out under the Auspices of the National Research Council and the Entomological Branch, Dept. of Agric., Ottawa.**—*Nat. Res. Council. Rep. No. 17.* 94 pp. With frontispiece & 14 plates. 1926. Ottawa.

In the spring and early summer, when the mountain snows of British Columbia are melting, the Fraser River, which springs from them, so far from " shepherding her bright fountains " lets them run wild all over the Lower Fraser Valley to give birth to myriads of mosquitoes—such myriads as at times and places to put a stop to the rurâl industries and even to interfere with the development of the country. How these insects swarm may be judged from the fact that the author exposing his arm for a few minutes one day towards the end of July, collected 45 of them settled upon it—of 6 species. As a prelude to abating this annual pestilence, a complete survey of the flooded areas and a searching investigation of the life-histories of all the mosquitoes to which they give birth has been made, and the results are here published along with a good deal of information about the local mosquitoes that breed in other, more permanent, waters, and much familiar matter of an educational kind, about the structure and habits of mosquitoes in their adult and developmental stages, their classification, and the various established methods of offence and defence against them.

Altogether the author finds 33 species of mosquitoes represented in the Lower Fraser Valley—13 Aedes, 4 Culiseta, 3 Culex, 2 Anopheles, and 1 Mansonia. Only two of them, however, are prolific pests, namely, *Aedes aldrichi* and *Aedes vexans*, and both have their nursery in the flood-waters. Of these two species very full particulars are given , of the other 31 species the author is content to give much briefer statements of the points by which each may be recognized easily, its relative importance for man and its abundance, its distribution, its breeding-grounds, and its life-history.

Of the two dread pests *Aedes aldrichi* was the more abundant during the present three years' investigation—33 of the 45 mosquitoes that settled on the author's arm, as told, were of this species. It is a vicious biter and inflicts much pain, and it persistently haunts houses, being so small that it can often creep through screens. Its larvae are found almost exclusively in cottonwood flood-swamps ; but the adults can travel 15 miles from their watery nest, their dispersion being favoured by woodland. Both sexes are often found together on the flowers of a Spiraea.

*Aedes vexans* also swarms in enormous numbers. Its characteristic nurseries are pools in flooded meadows, but its adult flights may extend to 10 miles with ease. It also has the Spiraea habit. Both these species (like most of their northern congeners) deposit their eggs on the ground to remain dormant during the winter until the vivifying floods come.

Surveys have been made district by district of the position, extent, and characters of the main breeding areas of the Valley.

Observations have been recorded of the natural checks to mosquitoes and mosquito larvae that have been noticed at work in the field. A Nematode parasite, *Parameris canadensis*, is regarded as a very important check upon *Aedes vexans* by stopping development of the ovaries. Of the effective natural enemies of larvae wading-birds (particularly the Phalarope) the fry of trout and other fish, the larvae of Dytiscid and Hydrophilid beetles, Notonectid bugs, the larva of Eucorethra, and water-mites are specially mentioned ; dragonfly larvae, though terribly efficient in a laboratory dish, were noticed to be not very active in the field. Large numbers of larvae were killed by the drying-up of pools.

A. Alcock.

SCHWETZ (J.). [Agrégé à l'Université de Bruxelles, Médecin inspecteur au Congo Belge, chargé d'une mission d'études par le Comité Spécial du Katanga.] Etudes et Notes d'Entomologie Médicale sur le Katanga (Elevage, Tsé-Tsé, Tiques et Moustiques). [**Studies and Notes on Medical Entomology in the Katanga (Stock-Raising, Tsetse, Ticks and Mosquitoes).**]—pp. vi+185. With 2 folding maps. 1927. Office de Publicité, Anc. Etabliss. J. Lebègue & Cie, Editeurs, 36 rue Neuve, Bruxelles.

The ultimate obstacle to the exploitation of the riches of Katanga (to use the author's own blunt phrase, who candidly asserts his belief that it is money, not benevolent intention, that makes the mare go) is not so much dearth of labour, but dearth of the good raw meat by which hard labour is sustained. Could live-stock be raised on the large scale in a land so infested with tsetse-flies, this obstacle would be overcome; and to this question the present Studies contain a lucid and unhesitating answer. These Studies, therefore, though labelled "medical" are not of much immediate interest to the medical profession.

In his interesting account of a well-planned survey of topography and vegetation the author states that, apart from some vast swamps around certain lakes and river-courses, the greater part of Katanga is park-land quite unsuitable for grazing because infested with *morsitans*. There are certain parts, however, particularly in the district of Lomami, where the land is open savannah with fringes of a heavy *palpalis*-infested forest alongside the rivers; this land would be fit for occupation by graziers if the belts of forest were freed from *palpalis*. But the most important fact is that there are four grassy plateaux—Kundelungu to the east, Biano-Manika to the west, Marungu to the north-east, and Kibara to the north—all at elevations beyond the reach of tsetse-flies and quite suitable both for graziers and their herds. A defect in Kundelungu is that all the approaches to the massif and even to the edge of the plateau are infested with *morsitans*. In the case of Biano-Manika the approaches are free of fly in all directions but one. At Marungu *morsitans* exists on the lower slopes, but there are some safe approaches; and this plateau is the best of the four because in addition to pasturage it affords good tillage also. Kibara, about the natural beauties of which the author is almost lyrical, has rocky alpine summits and a dry climate which would probably suit sheep.

The results of the author's attentive survey of the distribution of tsetse-flies is exhibited in a large coloured map, but the account in the text is too minutely particular to be of more than local interest. The species generally found are *morsitans* and *palpalis*, *brevipalpis* occurring sparely in only one area, to the north-west. A point of general interest is the well-established suppression of *morsitans* within a radius of 30 km. from Elizabethville; this triumph is ascribed chiefly to the disappearance of game. Animal trypanosomiasis has followed suit, not a case having been reported within the environs of Elizabethville in 1925 and 1926. The only cases observed by the author were at two farms, one 120 km. to the north, another 85 km. to the south. A list is given of 19 species of mammals and 2 species of reptiles whose blood was examined by the author in different parts of Katanga in 1925 and 1926 without discovery of a single trypanosome.

The only noteworthy point in the report on ticks is the discovery of *Argas persicus* in Elizabethville and two other places in Katanga.

The mosquito survey has already been published elsewhere as a separate paper, and a summary of it is to be found in the Medical Zoology section of this *Bulletin*.

A. Alcock.

WU LIEN-TEH. [M.A. M.D., B.C. (Cantab); C.P.H. (Johns Hopkins); Hon. Litt. D. (Peking); LL.D. (Hong-Kong); Sc.D. (Shanghai), etc.] **A Treatise on Pneumonic Plague.**—League of Nations. Health Organisation. C.H. 474. 1926. May. pp. xiv+466. With 1 map & 40 figs. on 29 plates (5 coloured).

In this volume Dr. Wu Lien-Teh has brought together according to a well ordered scheme the knowledge and experience of pneumonic plague that has been gained up to the present. The book opens with a history of pneumonic plague gleaned from numerous reports of outbreaks in many lands. Then follows an account of plague in rodents which live in the open country apart from human habitations, and its spread to man. The comparatively small body of knowledge relating to natural plague in the tarbagan is rather surprising when one considers the number of years during which this animal has been suspected to be a plague carrier. For example, it appears that only 15 plague-infected tarbagans have been observed and recorded. Little seems to be known of the mode of spread of the epizootic. There are no observations on the seasonal prevalence of the tarbagan flea. Guineapigs have been infected by the agency of tarbagan fleas, but there is no record of flea-transmission experiments with tarbagans. The interesting problem of the carrying over of the infection through the winter months, when the rodents are hibernating, is still a matter for speculation. The author appears to attach importance to a chronic infection which he has observed in experimentally infected tarbagans and which, he thinks, may, under natural conditions, remain dormant in the hibernating animal, and so bridge the interval between epizootic seasons. Basing his opinion on the extensive work of the Plague Research Commission in India on the significance from an epidemiological standpoint of resolving (chronic) plague in *R. rattus* the reviewer thinks it unlikely that a smouldering infection of this kind will prove to be the link between epizootic periods. He inclines to believe that the infection is carried over in the tarbagan flea; BACOT's experiments with *C. fasciatus* kept at a low temperature are suggestive in this connexion. Comment is made upon McCOY's statement that pneumonic plague in man rarely occurs from rat infections and that the definite tendency to lung localization in plague-infected ground-squirrels is possibly significant. Pneumonic plague in man is so often found to be associated with plague in "field" rodents as to suggest an exceptionally intimate relationship and yet, as Wu Lien-Teh notes, epizootics among ordinary rats have sometimes led to pneumonic outbreaks in Upper Egypt. This is actually an understatement, the truth being that the pneumonic-plague outbreaks in the Qena-Girga district of Southern Upper Egypt—a typical pneumonic-plague region—owe their ultimate origin *solely*, so far as is known, to plague in *R. rattus*; in this district *R. rattus* transmits plague to man in the bubonic form by means of its flea, *X. cheopis*.

The chapter on the epidemiology of pneumonic plague is an excellent one, and is interspersed by comments and conclusions with which the reviewer is in general agreement. An important topic discussed is that of mixed infections in pneumonic plague. Dr. Norman WHITE has recently propounded the interesting theory that the *B. pestis* cannot by itself cause widespread epidemics of pneumonic plague, and he has invoked a symbiotic germ which prepares the way for the plague bacillus or reinforces its pathogenic action. Dr. Wu Lien-Teh cannot find evidence in support of this contention, and the reviewer also thinks that on epidemiological grounds the hypothesis is unnecessary. Another subject dealt with in this chapter is the alleged pneumotropism of the plague bacillus and its relation to the rise of epidemics of pneumonic plague.

In a hitherto unpublished paper Wu Lien-Teh and H. M. JETTMAR*

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*WU LIEN-TEH & JETTMAR (H. M.). **A Systematic Experimental Study of the Pathology of Pneumonic Plague in the Tarabagan and Sisel (Suslik).**—*North Manchurian Plague Prevention Service. Reports* **1925–1926.** Vol. 5 of the Series. pp. 1–25. With 1 text fig., 4 coloured plates & 12 microphotos. [42 refs.]

give the histological findings in 20 tarbagans and 9 sisels (susliks) experimentally infected by the method of inhalation. From the results obtained the authors are confirmed in their opinion that infection in plague pneumonia is not a faucial or even a tracheal one, but is essentially an invasion of the deeper portion of the respiratory tract.

In the treatise under review a survey is made of the conceivable modes of infection in pneumonic plague, whether directly from the patient or indirectly by objects contaminated with infective sputum droplets, or by deposits of sputum, or through the medium of the plague corpse, and the conclusion [a sound one] is reached that the patient's cough alone constitutes the real danger, all other modes of infection being merely potential.

The author believes that carriers play only a limited part in the spread of pneumonic plague. The reviewer thinks the carrier rate of respiratory diseases spread by droplet infection must bear a relation to the lethal power of the infecting organism. When, as in pneumonic plague, the mortality is virtually 100 per cent., the carrier problem perforce diminishes to negligible proportions.

Consistently with the opinion that indirect modes of infection play a minor part the statement is made that a critical attitude towards routine disinfection in pneumonic-plague epidemics seems fully justified, and a plea is rightly made for the exercise of discretion and common sense in applying measures of disinfection.

The author would, we think, have added to the usefulness of his report if he had prepared a final summary of the conclusions to which he has come from his comprehensive study of pneumonic plague. Increasing interest is being taken in that group of diseases in which the infective droplet is the medium of transmission from man to man, wherever in the respiratory tract the infecting micro-organism may find entry. The work of WEBSTER on the experimental epidemiology of respiratory infection, that of BLAKE and CECIL on the experimental production of pneumonia, and the epidemiological observations of DUDLEY have helped to make clear the factors which combine to light up and keep alive epidemics of respiratory infection spread by direct contact. The cumulative work on the epidemiology of pneumonic plague assembled in this treatise forms a noteworthy contribution to the subject.

G. F. Petrie.

CHATTERJI (Karuna K.). [F.R.C.S.I., Major, I.T.F. Med. Corps, Surgeon, Medical College Hospitals, Calcutta, etc.] **Tropical Surgery and Surgical Pathology.** With a Foreword by Major-General Sir R. Havelock CHARLES [G.C.V.O., K.C.S.I., M.D., LL.D., M.Ch., F.R.C.S.I., I.M.S. (ret.), etc.]—pp. xxx+244. With 91 plates, 20 in colour & 5 charts. 1927. London: John Bale, Sons & Danielsson, Ltd. 83–91 Great Titchfield Street, W. 1. [16s.]

The need of a textbook of this kind has for some time been felt and the author, a well-known Calcutta surgeon and teacher, is to be congratulated upon a very successful effort to meet a recognized want. In his preface Major Chatterji refers to the difficulties experienced in writing in a foreign language on intricate and technical subjects, and pleads for indulgence in the matter of literary and linguistic shortcomings by no means manifest to the reader. The author's experience has been acquired in India which, with its diversity of climates and climatic conditions, he rightly regards as presenting for the student "an epitome of the world."

In the introductory chapter reference is made to modes of living and the choice of food, beverages, and clothing essential to the maintenance of health in tropical climates. Questions of hospital organization and equipment are touched upon, and the urgent necessity stressed of improving the latter, especially in rural areas. The physical and mental qualities required of a tropical surgeon are considered and some interesting emergency experiences detailed. Chloroform is regarded as the best and safest general anaesthetic in warm climates, more especially in the absence of skilled anaesthetists, precautions being taken to ensure its purity and prevent decomposition.

Eight chapters are devoted to Amoebiasis as it affects the various regions and viscera of the body, with special reference to the classes of case in which surgical intervention is called for, and the form which such intervention should take. For the evacuation of liver abscess the author favours aspiration, but with the object of avoiding the risk said to be attendant upon the use of large-sized aspirating canulae, and in order to ensure effective removal of clots and debris from the abscess cavity, he employs a special aspiration-irrigation canula with a three-way stopcock arrangement. This ingenious device has in practice given excellent results, one hundred and fifty-three cases having been so treated with one death. The open operation he reserves for those cases in which secondary infection has taken place, in which pus accumulates in spite of repeated aspirations, or where the abscess has burst into a perihepatic space. The interesting observation is made that cerebral complications would appear to be more common after open operation than after aspiration. Major Chatterji is apparently a believer in the existence of " tropical liver " as a distinct clinical entity not necessarily dependent on amoebic infection.

Another section, also of eight chapters, deals with the pathology and surgical aspects of Filariasis perhaps as fully as can be expected in a students' handbook. All tropical surgeons with experience of such cases will agree with the writer in his statement, which has special reference to the involvement of thoracic or intra-abdominal glands, that filarial infection and suppuration often lead to much confusion in diagnosis and that prognosis is frequently grave. Under medicinal treatment for Filariasis generally, and again under the treatment of many of its manifestations the use of ethyl ester margosic by hypodermic and intramuscular injection is advocated. It is stated that by this treatment symptoms are ameliorated, the severity of the inflammatory attacks reduced, and the quiescent periods considerably prolonged. The differentiation of conditions produced by lymphangiectasis of the spermatic cord from other inguino-scrotal swellings—by no means an easy matter—is admirably dealt with. For large hydroceles the writer favours a method of operation by plication and overlapping in preference to eversion or excision. For Chylocele he recommends the same procedure and makes no reference to the possible safety-valve action exerted by tapping at regular intervals, with its consequent prevention of extension of trouble. Lymphadenovarix, most common in the groin, is dealt with very briefly, and the objections hitherto believed to apply in most cases to enucleation of the glands are ignored. The use of the rubber tourniquet in the various operations for elephantiasis of the scrotum is deprecated. The liquid extract of Lodh (*Symplocos Racemosa*) is mentioned as a useful internal remedy in Chyluria.

Section III on the Tropical Granulomata is good, and here again ethyl ester margosic preparations and compounds are said to be of considerable efficacy in treatment. The clinical differentiation between Yaws and Syphilis is very clearly set forth, and the interesting fact recorded that under the influence of pyrexia due to Malaria or other diseases the lesions of yaws may retrogress or clear up altogether. A case actually cured by high fever accompanying Smallpox has been reported. The author devotes a few lines to subacute inguinal lymphogranulomatosis which he does not appear to consider identical with climatic bubo, an affection to which the book contains no further reference.

The views expressed in Section VIII on the relative prevalence of benign and malignant growths in tropical and temperate regions, and the apparent rarety of 'malignant transformation' of benign tumours in India are

**interesting, as is the claim to have cleared up malignant growths by injections of ethyl ester copper margosate, supplemented and expedited in some cases by radiation.**

In a chapter on Vesical Calculi the author notes that many cases of recurrence after litholapaxy have come under his observation.

The book closes with short chapters on snake bite and on the technique of intravenous injection of saline solution in Cholera. The latter is clear and detailed and likely to be of great and frequent assistance in emergency.

This work can be strongly recommended alike to student and to graduate. It contains much that is original and will well repay perusal and study. The author is a surgeon of experience and resource, and the appreciative remarks of Major-General Sir R. Havelock Charles in his foreword are well merited.

The volume is of convenient size, well printed on excellent paper, and with an entire absence of printer's errors. Plates and illustrations are excellent, many of them quite new.

J. J. Pratt.

KRAUS (R.). [Prof. Dr. Direktor am staatlichen serotherapeutischen Institut in Wien.] 10 Jahre Südamerika. Vorträge ueber Epidemiologie und Infektionskrankheiten der Menschen und Tiere. **[Ten Years' Experience of Infectious Disease in Man and Animals in S. America.]**—pp. viii+182. With 108 text figs. 1927. Jena: Verlag von Gustav Fischer. [11s. 6d.]

In this small book of 180 pages, Professor R. KRAUS, formerly Director of the Bacteriological Institute of the Department of Hygiene in Buenos Aires, has given a summary of the present state of medical affairs in the Argentine, Brazil, and other States of South America. During the last ten years progress in medical education has been very great; according to the author, the number of graduates and students at Buenos Aires and Rio de Janeiro is so large that it is difficult for so many doctors to obtain a decent livelihood, and there are practically no openings for a career for foreigners. The photographs of the medical school at Bahia and of hospitals, there and elsewhere, show large and imposing buildings; the medical education given is good and essentially practical, though still open to criticism in some respects.

There are brief notices of CARLOS FINLAY, OSWALDO CRUZ, and JOSE PENNA, whose names are closely associated with the history of modern hygiene in South America.

The chief tropical diseases met with are enumerated with their geographical distribution, but no attempt is made to give clinical descriptions of them. The treatment of snake bite, and the mode of preparation of antivenene at the Snake Institute at Butantan (Sao Paulo) are described at considerable length, and the article is illustrated with excellent photographs. According to an estimate made by VITAL BRAZIL, about 18,000 persons are bitten by venomous snakes every year in Brazil; of these, 4,000 died before the introduction of serum therapy. It is claimed that, by early treatment, the mortality is reduced to 3 per cent. The author found that antitoxic serum derived from South American crotaline vipers neutralizes the poison of European vipers as completely as that prepared by CALMETTE from European viperine venom. The value of antivenene is so well recognized by the people of South America that there is no difficulty in obtaining an ample supply of live venomous snakes in exchange for serum, syringes and money rewards.

The alleged causal relationship between Chagas's disease, endemic goitre and cretinism is discussed, but Professor KRAUS considers that further study and experience are necessary before the matter can be regarded as definitely settled.

Some remarkable statistics are quoted showing the great and very rapid increase in the population of some of the South American cities: thus, in 1888 the inhabitants of Buenos Aires numbered less than half-a-million; in 1925, they amounted to more than two-and-three-quarter millions. In the former year the general death rate was 27·17 *per mille*; in the latter year about 14 *per mille*, a result which can only be attributed to the great improvement that has been effected in the hygienic conditions of the town.

The book is fully illustrated with very good photographs and a few coloured drawings: although each subject can only be considered in a cursory way within the narrow bounds of such a small book, the volume is well worth reading as a convenient and accúrate epitome of the present condition of medical science in South America.

H. J. Walton.

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## *Far Eastern Association of Tropical Medicine: Seventh Congress.*

We are informed by the General Organizing Secretary of the 7th Congress of the Far Eastern Association of Tropical Medicine, that the seventh Congress will be held in India in December, 1927. The Congress will open on Monday, December 5th, at Calcutta, where the Scientific Sessions will be held, occupying the first week. The Official Delegates will then be taken on certain arranged excursions. The Congress and Tour will end on December 22nd. Applications for membership should be addressed to :—

Lt.-Col. J. Cunningham, I.M.S.,
General Organizing Secretary,
7th Congress, F.E.A.T.M.,
Pasteur Institute of India,
Kasauli, Punjab, British India.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 7.

## HELMINTHIASIS.

Faust (Ernest Carroll). **Parasitic Infections and Human Disease in China.**—*Arch. Path. & Lab. Med.* Chicago. 1926. Aug. Vol. 2. No. 2. pp. 223–240. With 1 map in text. [50 refs.]

Faust divides the Sino-Japanese area into five regions, each with its own dominant infections, as follows: (1) *Tropical oriental* (French Indo-China, south China littoral to Fukien with Hainan and Formosa) where the dominant infections are malaria, amoebiasis together with Clonorchis, Fasciolopsis, Hookworm, Ascaris, Whipworm and Filaria. (2) *Subtropical oriental* (Central and lower Yangtze littoral to Kiangsu and southern Korea and southern Japan) where are found *S. japonicum*, and Paragonimus together with amoebiasis, Hookworm, Ascaris and Trichocephalus. Malaria is also extensive. (3) *Intermediate* region between the oriental and palearctic with no dominant infections. (4) *Palearctic* (the cold semi-dry regions of northern China, Manchuria, Korea and Japan). In China kala azar is dominant, in Japan, *Dibothriocephalus latus*. Malaria is endemic. (5) *Dry Palearctic* (the arid uplands of north western China and Mongolia). No infections are dominant, but occasional cases of kala azar, Ascaris and hydatid are found.

Intermediate and reservoir hosts are very important in the Far East—there are at least eight species of flukes in China, all requiring intermediate hosts and of these in only one, *Schistosoma japonicum*, is man the only important definitive host involved. In Fasciolopsis and Clonorchis, the pig, dog and cat are very important reservoirs. The economic use of night soil together with promiscuous defaecation and uncleanly habits perpetuate these infections. Raw food products are extensively used, and it is only because the habits of people and climate vary in different parts that the infections are not all wide-spread.

The more important parasitic infections are briefly described. Schistosoma is found mainly in the Yangtze valley (where the intermediate host is *Onchomelania hupensis*) and on the coastal streams (where *Katayama nosophora* is implicated). Clonorchis is carried by *Bithynia striatula* and is only heavy near Kwang-tung. Paragonimus is most common in Korea and Formosa. *Opisthorchis felineus* is of clinical importance in Russia and Siberia. Metorchis is found only in cats and several species of Heterophyid flukes are common in cats and dogs and occur occasionally in man (Metagonimus, Heterophyes and

Stamnosoma). Fasciolopsis occurs in south and central China and Formosa. In central China the dog is an important reservoir host. Human infection is heavy in Shaohsing, Canton and Siulam. Other flukes include Fasciola and Dicrocoelium in ruminants, Eurytrema in pigs and ruminants, and Watsonius occasionally in monkeys.

Hookworm is extensive in south China. Filariasis is incompletely known. The commonest human parasite is Ascaris, while Whipworm is only less so. Gnathostoma occasionally causes a creeping disease. *Taenia solium* is endemic in central and north China, while *T. saginata* is common in the north. Hydatid is found in Mongolia. *Sparganum mansoni* is common throughout the area in the subcutaneous tissue of frogs and snakes; its adult form, which is resident in the intestine of the dog, cat and man, is more common in man in China than the larva. *D. latus* is found in Siberia and northern Japan. It is not endemic in China. *Dipylidium caninum* and *H. nana* also are found in human beings. Many of the important references to which Faust refers in this very valuable survey have been previously abstracted in this *Bulletin*. [See also summary *ante*, p. 385]

T. W. M. Cameron.

VENERONI (Carlo). Note di elmintologia medica nella Somalia Italiana. [**Medical Helminthology in Italian Somaliland.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Jan. Vol. 8. No. 1. pp. 26–28.

Veneroni gives an annotated list of the helminths occurring in Italian Somalia. The commonest cestodes are *H. nana* and *T. saginata*, the latter being especially common. Among the roundworms, Ascaris is common while Ancylostoma and Necator are found in 34 per cent. of the natives. Trichocephalus is also frequent, while several cases of *F. bancrofti* have been observed by the author. *S. haematobium* is found in about 30 per cent. of the population and is a serious infection. The only snail capable of acting as intermediate host is a species of *Ampullaria*. *Schistosoma mansoni* is absent.

T. W. M. C.

DA SILVA (F. Venancio). Note sommaire sur l'infestation de l'intestin des indigènes d'Angola. [**Intestinal Infestations of the Natives of Angola.**]—*Revista Méd. de Angola.* (No. especial 1e. Congresso de Med. Trop. da Africa Ocidental. Vol. 4. 6a. 7a e 8a Sessões.) 1923. Aug. No. 4. pp. 381–388.

The Angola natives have an infection with hookworms (Ancylostoma and Necator) amounting to between 70 and 93 per cent. and often in consequence show a certain amount of anaemia and weakness, although in many cases no symptoms are present. The author recommends a campaign for the eradication of the disease with compulsory anthelmintic treatment. Ascaris, Whipworm and Strongyloides are also common.

R. T. Leiper.

DAVIES (D. S.). **The Detection and Treatment of Bilharziasis and Ankylostomiasis in Dongola Province, Anglo-Egyptian Sudan.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 436–446.

Dongola is a small unimportant province with a very important source of intelligent labour. Bilharziasis was found in 1921 to be endemic in

Nuri and treatment with tartar emetic was commenced. The author finds that only those urines showing albumen need examination for ova of schistosomes; later he satisfied himself that albumen practically did not exist without the worm. Natives were also examined for hookworms by dosing with carbon tetrachloride, the stool being afterwards searched for adult worms. Nearly 5,000 cases (over 30 per cent. of the total population) were investigated; 9·7 per cent. were found to be infected with schistosomes and 11·2 per cent. with ankylostomes. In various selected centres the inhabitants were treated intensively for these conditions, and by this means it is hoped to eradicate the diseases in a few years.

R. T. L.

RODRIQUES (J. S. N. Humberto). Contribuição para o estudo do indice parasitologico intestinal na India Portugueza. [**Intestinal Parasitic Index in Portuguese India.**]—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Gôa. 1926. Vol. 3. pp. 296–325. [3 refs.] [French summary p. 325.]

Rodriques has examined the faeces of natives at Gôa and finds that both Ancylostoma and Necator are present and are fairly common (about 20 per cent. of each in 250 patients examined). Other parasites are Ascaris (75 per cent.), Trichocephalus (55 per cent.) Oxyuris, and Strongyloides.

T. W. M. C.

PLAVTOV (K. A.). **The Results of Helminthologic Examination of Children's Homes by the American Committee in Armenia.**—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 4. English summary p. 336. [In Russian pp. 295–298.]

The American committee at Leninakan (late Alexandropol) in 1922–25 examined 1,311 children for the presence of parasites and found Whipworm (563), Ascaris (558), *T. saginata* (136), *H. nana* (25), *Trichostrongylus instabilis* (14), Oxyuris (12), Strongyloides (1), Fasciola (1) and Hydatid (1).

T. W. M. C.

MAKHVILADZE (N.) & DIDEBULADZE. [**On the Endemic Foci of Ankylostomiasis in Georgia.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 1. pp. 23–28. With 4 text figs. [In Russian.]

The authors have conducted systematic examinations of the faeces of patients attending the Tiflis University Clinic from 1922 till 1924, the total number examined being 630. The following worms were found to be prevalent: *Trichuris trichiura* (72·5 per cent.), *Ascaris lumbricoides* (55·88 per cent.), *Taenia saginata* (2·22 per cent.), *T. solium* (3·23 per cent.), *Hymenolepis nana* (0·49 per cent.), *Enterobius vermicularis* (1·47 per cent.). Ankylostomiasis (both Ancylostoma and Necator being represented) occurs chiefly in Western Georgia, where 50 per cent. of the cases examined were infected, whereas from Eastern Georgia there are no cases on record. The difference is attributed to climatic conditions.

C. A. Hoare.

LEIPER (R. T.). **Discussion of the Validity of Certain Generic Names at present in Use in Medical Helminthology.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 484–491.

From an examination of the original literature dealing with the nomenclature of some of the commoner helminths of man, Professor Leiper concludes that many of the names recently introduced into common use do not comply with the strict interpretation of the Law of Priority. This states that the valid name of a genus or species can be only the name under which it was first designated on the condition: (*a*) that this name was published and accompanied by an indication or a definition or a description, and (*b*) that the author has applied the principles of binary nomenclature.

*Trichuris* was proposed by ROEDERER in 1761 as a specific, not a generic name, and ROEDERER did not apply the principles of binary nomenclature. Accordingly the name of *Trichocephalus* is the correct one.

Similarly *Dioctophyme* was used by its originator, COLLET-MEYRET, in a colloquial sense, and the correct name of the only species is *Eustrongylus visceralis*.

Similarly the correct names of the common Round worm and the Seat worm of man are *Stomachida lumbricoides* and *Ascaris vermicularis*.

" *Lumbricus canis,*" the type of STILES' genus *Toxocara* in 1905, does not exist, WERNER having used the expression *Lumbrici canis* as a heading to his description and *Lumbricus ex cane* in the Latin text. This name is accordingly replaced by *Belascaris* Leiper 1908.

*Dracunculus* also was not used validly until COBBOLD used it in 1864, by which time it had been preoccupied. Leiper accordingly renames the Guinea worm *Fuellebornius*.

The article is a severe criticism of the loose way in which some workers have interpreted the second condition of the Law of Priority, and many examples of this are quoted. In the days when Latin was the common scientific tongue, writers describing colloquially a species had often of necessity to use an apparently binominal expression although they had no intention of adhering to the Linnean system. Other colloquialisms have also been pressed into formal nomenclature with the most unfortunate results. Professor Leiper's intention is not so much to insist on these changes necessitated by a strict interpretation of the Law, but to draw attention to the intolerable situation in nomenclature which has arisen owing to its interpretation in the past and may arise owing to its too strict application in the future.

T. W. M. C.

CAMERON (Thomas W. M.). **The Helminth Parasites of Animals and Human Disease.**—*Proc. Roy. Soc. Med.* 1927. Mar. Vol. 20. No. 5. pp. 547–556 (Sect. Comp. Med. pp. 15–24).

This is essentially an annotated list of the helminths of man and their animal hosts. The author discusses the epidemiology of hydatid disease, cysticercosis, Dibothriocephalus and Trichinella. The importance of reservoir hosts and of biological strains is considered. It is pointed out that most of the helminths of man are apparently of herbivorous origin originally, only a few—notably tapeworms and Ancylostoma—being of carnivorous origin. It is suggested that the distribution of the two genera of hookworms supports the theory of a dual origin of man (as had been previously suggested by Darling). The article concludes with a list of helminths of man, together with the animals in which they may be found.

R. T. L.

Lyssenko (B.). Capillairoscopie chez les enfants malades d'helmintiasis. [**Capillaroscopy in Children infested with Helminths.**]—*Jl. Méd. de l'Asie Centrale.* Tashkent. 1926. Vol. 5. No. 8. French summary p. 527. [In Russian pp. 469–476. With 6 figs. on 1 plate.]

Lyssenko has examined 24 children, between the ages of 7 and 14, who were suffering from helminthic infections (mainly Hymenolepis, but including also, in some cases, Taenia, Ascaris, Oxyuris and Whipworm; in two cases, Fasciola, and in one, Fasciola and Dicrocoelium). He considers that helminths play a considerable part in determining vaso-nervous changes; but the existence of such a change as an independent unity requires confirmation.

R. T. L.

Kudicke (Robert) & Borchardt (Werner). Der Einfluss von Galle und Pankreassaft auf die Wirksamkeit wurmtötender Arzneistoffe. [**Influence of Bile and Pancreatic Juice on the Activity of Vermicidal Drugs.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 467–475. [10 refs.]

These authors have examined the action of bile and pancreatic juice on various anthelmintics—more especially the halogen compounds of various hydrocarbons. They find that bile is a better solvent of these drugs than pancreatic juice or water, but from *in vitro* experiments on larvae they conclude that the unfavourable action of the bile will be neutralized to some extent by the pancreatic juice. An excess of bile not only reduces the action of the drug on the worms, but assists in the absorption of the drug by the body. They consider that research must be made into methods of stimulating the action of the pancreas during anthelmintic treatment and reducing the secretion of bile during this period.

T. W. M. C.

Chen (K. K.) & Hsiang-Chuan Hou. **The Alleged Anthelmintic Property of** ***Quisqualis indica*** **(Shih Chun Tze), with Case Reports.**—*Amer. Jl. Med. Sci.* 1926. July. Vol. 172. No. 1. (No. 652). pp. 113–116. With 1 fig. [3 refs.]

*Quisqualis indica* has been considered to be a powerful anthelminthic, and Davenport in 1918 reported its successful use in ascariasis but not for other intestinal parasites. Chen and Hou have tested both the gum and the whole seed (raw and baked) and find that it has no anthelmintic action whatever for ascaris in man or dogs.

T. W. M. C.

Callanan (J. C. J.). **Preliminary Note on the Value of Three Examinations of Faecal Specimens in the Diagnosis of Entozoal Infections.**—*Kenya Med. Jl.* 1927. Vol. 3. No. 10. pp. 290–292.

Faeces were examined by emulsifying in normal saline and centrifuging; and the author considers that it is necessary to examine patients on at least three occasions in order to demonstrate all the varieties of ova found.

T. W. M. C.

FAUST (Ernest Carroll) & NISHIGORI (Masao). **The Life Cycles of Two New Species of Heterophyidae, Parasitic in Mammals and Birds.**—*Jl. Parasit.* 1926. Dec. Vol. 13. No. 2. pp. 91–128. With 4 text figs. & 28 figs. on 3 plates. [47 refs.]

Faust and Nishigori describe two species of heterophyid flukes which they have succeeded in transmitting to man and various mammals and birds. These flukes—*Monorchotrema taihokui* and *M. taichui*—are characterized by the possession of a single testis and do not appear to exert any considerable pathogenic action on the host. Both species have snails of the genus *Melania* as their first intermediate host and various fresh-water fish as the second. In the snail, the stages are sporocyst and rediae. The lophocercous cercaria has a muscular tail with fluted keeled margins, and possesses eye-spots. The metacercariae are usually found in the fins, but also in the head, palate, and gill-arches—only seldom in the scales or muscles. The adult flukes live in the upper part of the small intestine when young, in the middle and lower parts when mature. The eggs closely resemble those of Clonorchis but have a less conspicuous "shoulder." Confusion, however, is very easy.

The authors believe that it is probable that the life history of these two species is characteristic of the heterophyid flukes in general and that adults of the same species may alike be found in mammals and birds.

They accept the validity of the genus *Stamnosoma* (this *Bulletin*, Vol. 20. p. 208), and consider that *Centrocestus cuspidatu* var *caninus* Leiper is a specimen of *S. formosanum.* In a footnote they point out that the correct name of *Metagonimus* is *M. yokogawai* (Katsurada, 1921), the name of *Heterophyes yokogawai* antedating *Loxotrema ovatum* by five months.

T. W. M. C.

CILENTO (R. W.) & BACKHOUSE (T. C.). **Paragonimiasis: its First Recorded Occurrence in the Territory of New Guinea.**—*Med. Jl. Australia.* 1927. Jan. 15. 14th Year. Vol. 1. No. 3. pp. 79–81. With 3 text figs. [3 refs.]

Cilento and Backhouse report the presence of Paragonimus from a native of New Guinea discovered during a routine examination: and as the man came from a village where practically no intercourse has taken place with Europeans or Asiatics, they conclude that an endemic focus exists. The natives use crabs as a staple of diet.

T. W. M. C.

VASILIEVA (A. P.). **[Distomiases of the Liver in Children observed in Turkestan (Fascioliasis and Dicrocoeliasis).]**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 1. pp. 36–43. [In Russian.]

Distomiases due to *Fasciola hepatica* and *Dicrocoelium lanceatum* were found in Turkestan in seven and two cases respectively out of 204 children examined. The disease had a chronic course, the chief symptoms being pain in the hepatic region, sickness and vomiting, dizziness and increased nervous excitability. Clinically, a diffuse hypertrophy of the liver was noted, while the following blood changes were observed: slight lymphocytosis, eosinophilia (25 per cent.) and monocytosis (12 per cent.). Leucoblasts, promyelocytes and Turk's cells were present in small numbers in each blood film examined. For the detection of trematode eggs the duodenal juice was collected and centrifuged. Treatment was successfully conducted with emetine hydrochloride administered intravenously (3–4 cc. of one per cent. solution) fifteen injections usually resulting in a complete cure.

C. A. Hoare.

FLURY (Ferdinand) & LÉEB (Franz). Zur Chemie und Toxikologie der Distomen (Leberegel). [**Chemistry and Toxicology of Liver Flukes.**]—*Klin. Woch.* 1926. Oct. 29. Vol. 5. No. 44. pp. 2054–2055.

From a study of the liver-flukes, *Fasciola hepatica* and *Dicrocoelium lanceatum,* Flury and Léeb conclude that the parasites contain no single specific toxin. The disease consists in a poisoning caused by a series of various injurious substances, formed in part by decomposed tissue and in part by the physiological activities of the parasites themselves.

T. W. M. C.

GUILLON (A.). Note sur le traitement des distomatoses par l'extrait éthéré de fougère mâle. [**Treatment of Liver Fluke Disease by Male Fern.**]—*Ann. de Med. et de Pharm. Colon.* 1926. Oct.–Nov.–Dec. Vol. 24. No. 4. pp. 593–595. [1 ref.]

The author recommends the trial of male fern in human liver fluke disease on account of the success of this treatment in corresponding conditions in animals.

ONORATO (Raffaele). Un caso di distomatosi epatica ed erratica, da *Fasciola hepatica,* in Tripolitania. [**Case of** *Fasciola hepatica* **Infection in Tripolitania.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1924. Oct.–Nov.–Dec. Vol. 5. No. 10–11–12. pp. 129–142. With 3 text figs. [4 refs.]

Onorato records a case of Fasciola infection in a native of Tripolitania, two specimens being found in an appendicular abscess.

NAGANO (Kanji). **The Geographical Distribution of the First Intermediate Host, "Bythinia striatula var. Japonica," in Okayama Prefecture.**—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1927. Jan. No. 444. English summary pp. 131–132. [In Japanese pp. 124–131. With 1 map. 5 refs.]

The molluscs are found in the south-western part of the prefecture. The area, severely infested with *C. sinensis,* is near Kojima Bay, and is low-lying clayey soil with much stagnant water. The incidence decreases as the distance from this spot increases. A map showing the distribution is given.

ODAKA (Yoshio), MURATA (Shiro) & NAGAO (Syuzo). [**Distribution of Parasites in Ukishima Village and the Suburb of Numazu City in Shidzuoka Prefecture.**]—*Iji Shimbun* (*Med. News*). 1926. Aug. No. 1193. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. p. 350.]

Pulmonary distomiasis and schistosomiasis Japonica are recorded.

PLAVTOV (K. A.). **Distomiasis among the Population of Nakhichevan.**—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 4. English summary p. 335. [In Russian pp. 291–294. 5 refs.]

Plavtov has examined 307 persons and has found seven different species of helminths in 194 cases. Five of these were *Dicrocoelium lanceolatum.*

T. W. M. C.

BLACKLOCK (D. B.). **The Prevention of Human Schistosomiasis in Sierra Leone: Progress Report on the Kaiyima Scheme.**—*Sierra Leone Ann. Med. & San. Rep. for the Year 1925.* pp. 68–72. With 9 figs. on 3 plates.

Endemic schistosomiasis, in addition to being a very serious disease, is a sign of inadequate education in hygienic principles. Accordingly an educative, hygienic experiment has been put into operation in the village of Kaiyima. This includes a pure water supply, efficient refuse and faecal disposal, provision of snail-free bathing and washing places, treatment of polluted water and control of the water supply. The results so far have been encouraging. Prior to 1924, 30 per cent. of the local intermediate host—*Physopsis* sp.—were infected; now the snail has apparently disappeared. Disposal of excreta is becoming satisfactory and it is proposed to extend the experiment to other villages.

R. T. L.

LEGER (Marcel). Les bilharzioses en Afrique Occidentale Française. [**Schistosomiasis in French West Africa.**]—*Revista Méd. de Angola.* (No. especial le Congresso de Med. Trop. da Africa Ocidental. Vol. 3. 3a, 4a e 5a Sessões). 1923. Aug. No. 4. pp. 141–148.

Leger examined 159 cases of Schistosoma infection in French West Africa at Dakar during 1922–23. Nineteen of these were intestinal cases, 6 being caused by *S. haematobium,* while of the cases which were vesicular 140 were caused by this parasite and only one by *S. mansoni. Bullinus contortus* is found at Médina (Upper Senegal) as also is *B. strigosus*; *Planorbis boissyi* has not been reported from this neighbourhood although 16 other species of this genus occur.

T. W. M. C.

DURAND (Paul). La bilharziose au Sahara-Djanet. [**Schistosomiasis at Djanet in the Sahara.**]—*Arch. Inst. Pasteur de Tunis.* 1926. Dec. Vol. 15. No. 4. pp. 348–361. With 1 map & 1 fig. in text. [13 refs.]

South of the Sahara, bilharziasis is widespread in the French colonies; on the Mediterranean littoral, however, it is much less serious. The state of affairs in the desert is less well known, and except for Djanet, Algeria is free from the disease. At this oasis, however, where a considerable circulation of population exists, *Schistosoma haematobium* is present and *Bullinus contortus* is plentiful [see this *Bulletin,* Vol. 23, p. 474.]

R. T. L.

ANDERSON (Ch.) & DE LAGOANÈRE (J. L.). A propos de la bilharziose en Tunisie. Nouveaux essais d'infestation de *Bullinus brocchii* avec des oeufs de *Schistosomum haematobium.* [**Attempts to infest** *B. brocchii* **with** *S. haematobium.*]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 23–25. [4 refs.]

Using miracidia hatched from eggs of *Schistosoma haematobium* (found in the urine of a Senegalese), the authors have attempted to infect *Bullinus brocchii* var. Ehr. The snails died before the completion of the experiments but sporocysts were found in one snail out of twenty.

R. T. L.

RAYNAUD (Lucien). La bilharziose en Afrique du Nord. [**Bilharziasis in N. Africa.**]—*Bull. Office Internat. d'Hyg. Publique.* 1926. Dec. Vol. 18. No. 12. pp. 1409–1412. With 1 map. [12 refs.]

No cases of bilharziasis have been reported from Algeria except at the oasis of Djanet in the extreme South, although Bullinus has been recorded from the canals at Biskra. Several foci of *S. haematobium* exist in Tunis and various species of Bullinus occur there, including *B. contortus, B. brochii* and *B. dybowskii.* In Morocco there are also endemic foci and in Tangiers both *B. contortus* and *Planorbis dufourii* have been found.

T. W. M. C.

VENERONI (Carlo). La bilharziosi vescicale in Somalia. [**Vesical Schistosomiasis in Somalia.**]—*Riforma Med.* 1926. Jan. 4. Vol. 42. No. 1. pp. 9–10. With 1 map in text.

Although about 30 per cent. of the native population of Somalia suffer from *S. haematobium* infection, Veneroni has only been able to find a species of Ampullaria in this region, Bullinus being apparently absent. Examination of the urines of 100 cases of vesical schistosomiasis was negative for ova of *S. mansoni*, only *S. haematobium* being present.

T. W. M. C.

ADVIER. Note sur quelques cas de bilharziose observés en Cochinchine chez des soldats originaires des Antilles. [**Bilharziasis observed in Cochin China in Soldiers from the West Indies.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Oct.–Nov.–Dec. Vol. 24. No. 4. pp. 571–578.

Schistosoma infection does not exist in Indo-China, the only recorded cases being imported. The writer has examined 116 soldiers from abroad and found 32 infected with *S. mansoni* and one with *S. haematobium* (contracted in Algeria) and he considers that this large number of carriers in Cochinchina, with no indigenous cases, proves that the disease cannot exist there.

T. W. M. C.

SMITH (Sydney) & O'FARRELL (W. R.). **Subcapsular Rupture of the Spleen with Delayed Intraperitoneal Haemorrhage. "Bilharziasis."**—*Jl. Roy. Army Med. Corps.* 1926. Nov. Vol. 47. No. 5. pp. 373–376. With 3 text figs.

Smith and O'Farrell record a case of rupture of a spleen subsequent to a blow. The spleen was enlarged and congested and contained groups of terminal spined schistosome eggs surrounded by eosinophile cells. The liver also contained ova, many of which were degenerated; the bladder also was severely infected. They consider that death was due to the traumatic rupture of a small vessel, the consequent haemorrhage rupturing the capsule.

R. T. L.

KOHN (Salo). **Some Bilharzia Cases.**—*S. African Med. Rec.* 1926. Sept. 25. Vol. 24. No. 18. pp. 407–408.

Kohn records eight cases of Bilharzia disease and points out that urine should be examined on several different occasions in doubtful cases, as ova are not always found—sometimes only a single degenerate ovum may be seen. The degenerate ova always contain blue pigment granules.

R. T. L.

CAWSTON (F. G.). **A Case of Bilharzia Disease with the Spindle-Shaped Ova.**—*Jl. Trop. Med. & Hyg.* 1927. Mar. 15. Vol. 30. No. 6. p. 81.

Cawston records the occurrence of spindle-shaped ova in the urine of a boy who had a *S. haematobium* infection.

T. W. M. C.

KHALIL (M.). **A Comparative Study of the Methods utilised in the Treatment of Bilharziasis with a Report on a New Remedy "Bayer SB. 212."**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 451–467. With 2 charts in text. [16 refs.]

*Emetine* is much inferior to tartar emetic as a curative drug for schistosomiasis, but its value lies in its antihaemorrhagic action, and as amoebic dysentery is a frequent complication to intestinal schistosomiasis in Egypt it is often given alternatively with tartar emetic. It is also indicated where the intravenous route is not practicable as in children and fat persons, since it can be administered intramuscularly. It is a powerful depressent however, and should not be given where there is intolerance, circulatory disturbances, or renal disease. Neuritis is a common sequel to its use.

*Tartar emetic* is best given in a 6 per cent. solution in distilled water. This is practically a saturated solution, and so provides a valuable safety provision, as too concentrated a solution cannot be used: 1 cc. of this solution contains 1 grain of the drug, and as the maximum dose is 2 grains, a small syringe and a fine needle may be used. By using a solution of this strength and assisted by three lay attendants—to fill and clean the syringe, to arrange the patients, and to hold their arms, a single physician may treat at least 150 persons per hour. In Egypt, doses are given three times weekly for about three weeks, ·5, 1, 1·5 cc. on the first three days and 2 cc. daily thereafter. Khalil has treated over 6,500 persons in this way with over 90 per cent. of cures.

*Sodium antimony tartrate* is as efficient as the potassium salt (tartar emetic) but is more expensive and less stable. The decomposed salt is toxic.

*Bayer Sb. 212* is a new complex salt of an organic antimonyl acid. It is used in 2 per cent. solution (higher concentrations appear to be toxic), 1 cc. of which contains ·005 gm. antimony. Two severe cases have been treated by Khalil with this new drug, the injections, which commenced at 2 cc. and reached 8 cc., being given intramuscularly. By its use much more antimony can be administered in a given time and it is excreted more slowly than tartar emetic. Its disadvantage is its bulk. In its present form it is useful for children and fat persons where intravenous injections are not advisable.

R. T. L.

SPECHT (Richard). Die Behandlung der Bilharziosis mit dem Präparat Heyden 661 (Antimosan). **[Treatment of Bilharziasis with Antimosan.]**—*Deut. Med. Woch.* 1926. Mar. 26. Vol. 52. No. 13. pp. 519-520. [12 refs.]

Two Egyptian students (who had been in Germany for several years and were supposed cases of chronic nephritis) were found to have *Schistosoma haematobium* eggs in the urine, and in one eggs were also present in the faeces. In both cases the disease was of about one year's standing. The patients were quickly cured with injections of Heyden 661 (Antimosan), which is said to have had none of the unpleasant after-effects of tartar emetic. A further study of the therapeutic value of antimosan in endemic areas, where material is more abundant, would be very valuable.

R. T. L.

CHRISTOPHERSON (J. B.); KHALIL (M.). **Bilharzia Ova and the Test Tube.**—*Brit. Med. Jl.* 1927. Mar. 5. pp. 418-419. [10 refs.]; Apr. 9. pp. 702-703.

Christopherson contests the statements of KHALIL and of DYE that tartar emetic does not destroy bilharzia eggs. An examination of eggs in urine during treatment shows that the number diminishes and in about 8-9 days granular and degenerative changes are observed. Watery solutions of tartar emetic *in vitro* have a distinct action on ova. Antimony, he claims, does have a real effect on the ova, second in importance only to that on the adult parasite, which it later kills.

In reply Khalil points out that his experiments were designed not to show that tartar emetic had no lethal effect on Bilharzia eggs but to demonstrate the obvious fallacy underlying the test tube experiments whereby CHRISTOPHERSON had attempted to prove *in vitro* the accepted fact that in some way tartar emetic kills the Bilharzia ova *in vivo*.

R. T. L.

CAWSTON (F. G.). **Estimation of the Cure of Bilharziasis.** [Memoranda.]—*Brit. Med. Jl.* 1927. Mar. 19. p. 512.

Absence of ova during treatment does not signify cure, and until six weeks or so have passed without ova it is unsafe to consider the case as cured.

T. W. M. C.

FAIRLEY (N. Hamilton). **The Early Spontaneous Cure of Bilharziosis (*S. spindalis*) in Monkeys (*Macacus sinicus*) and its Bearing on Species Immunity.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 685-700. With 3 graphs & 3 figs. on 1 plate. [21 refs.]

Fairley finds that cercaria of *S. spindalis*, a natural parasite of the goat and other ruminants, will penetrate the skin of monkeys and develop to a certain extent in these animals. Schistosomulae were recovered 11 days after infection: 23 days after infection, parasites were absent but pathological lesions were still seen: 124 days after infection there was no trace at all. In these monkeys there had been a positive complement fixation test which rapidly rose and gradually declined. Experiments in goats demonstrated that the presence of a high antibody content in the blood could not be the cause of the disappearance of the parasite and Fairley suggests that this is an example of natural rather than acquired immunity. Man is also naturally immune.

T. W. M. C.

FAIRLEY (N. Hamilton) & JASUDASIN (F.). **The Experimental Transmission of *S. spindalis* to the Indian Water Buffalo.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 701–706. With 1 chart & 2 figs. on 1 plate. [3 refs.]

Fairley has successfully transmitted *Schistosoma spindalis* to two water buffaloes and the lesions and serological reactions in these animals are described. He believes that the buffalo will prove to be one of the main reservoir hosts of the parasite.

T. W. M. C.

FAIRLEY (N. Hamilton). **Complement Fixation with Bilharzia. Part II.—The Production of Specific Antibody by Intravenous Injections of Protein-Free Alcohol-Soluble Cercarial Extracts.**—*Jl. Path. & Bact.* 1927. Jan. Vol. 30. No. 1. pp. 97–112. With 6 text figs. [41 refs.]

The first part of Fairley's paper (this *Bulletin*, Vol. 23, p. 247–8) showed that alcoholic extracts of fresh livers of snails infected with *Schistosoma spindalis* acted specifically at high titres in complement fixation tests with goats. This substance is protein free and appears to be of a lipoidal nature. In the present research, the object was to determine whether any anti-body response occurred in normal or in infected goats, which are natural hosts of *S. spindalis*, following the injection of alcohol-soluble cercarial extract. Under normal circumstances, there is a maximum fixation of 1½ M.H. Doses. In non-infected and in cured goats, it appeared that, after a latent period of 1–2 weeks, antibody appeared in the serum but the maximal rise was small (up to 7½ M.H.D.). In infected animals and in those receiving a second series of injections, there was a decisive rise of antibody content within a few days of the injection and a high maximum antibody response (up to 27–60 M.H.D. and 12 M.H.D., respectively). Fairley concludes that these extracts function as true antigen and points out that a decisive rise within the first five days of injection is pathognomonic of schistosomiasis. As the extracts used are protein free there is no danger of anaphylaxis, and Fairley hopes that a similar type of injection with alcohol-soluble scolex antigen in hydatid, etc., may assist the ordinary serological methods of diagnosis.

T. W. M. C.

LAMPE (P. H. J.). Pathologisch-anatomische Veränderungen bei Bilharziasis mansoni. [**Pathological Changes in *S. mansoni* Infection.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 475–484. With 4 text figs.

In heavy infections with *Schistosoma mansoni* alterations in the lung are common. Miliary bilharziasis of the lung, liver, stomach, intestine, heart and lymph glands is difficult to distinguish macroscopically from miliary tuberculosis. The author points out that in spite of negative examinations of the stool, severe changes in organs or tissues may be due to this parasite. In endemic centres, other conditions, as appendicitis, peritonitis, bronchitis, asthma, etc., are sometimes due to this worm, although the true cause can only be found on microscopic examination on autopsy.

R. T. L.

ROMAN (Benjamin) & BURKE (Alice). **A Case of Carcinoma of the Colon associated with Schistosomiasis (Bilharziosis) in a Young Woman.**—*Amer. Jl. Path.* 1926. Nov. Vol. 2. No. 6 (Whole No. 12). pp. 539–544. With 6 figs. on 3 plates. [14 refs.]

The authors record the finding of an abdominal colloid adenocarcinoma involving the splenic flexure of the colon. The tumour contained many ova of *S. mansoni*, especially in its peripheral parts and in the adjacent parts of the colon, where adult worms were also found. While pointing out that in this case the two conditions might well be regarded as coincident, the authors believe that the parasites might in some way be responsible for the carcinoma.

R. T. L.

MACIEL (Heraldo). A influencia das forças cosmicas sobre a postura do *Schistosoma mansoni*. [**Influence of Cosmic Forces on the Egg-Laying of** *S. mansoni*.]—*Sciencia Med.* 1926. Nov. 30. Vol. 4. No. 11. pp. 588–594. [4 refs.]

Eggs of *S. mansoni* are passed out of the body normally within 24 hours of being laid. Temperature appears to play little part, but barometric pressure exercises a considerable effect on the egg-laying of the worm—a low pressure increasing the output. Examination of suspected stools for the ova is accordingly best made during a period of low pressure. In computing an "endemic index" for an area, this must be taken into consideration.

T. W. M. C.

FUJINAMI (Akira). **Historical Review of Scientific Investigations on the Pathology of Schistosomiasis in Japan, and Efforts for the Eradication of this Disease.**—*Japan Med. World.* 1926. Nov. 15. Vol. 6. No. 11. pp. 304–308.

Fujinami divides the history of the pathology of *S. japonicum* into five periods, viz.: (1) from the time when a characteristic clinical picture was first noted until the nature of the disease was discovered by pathologico-anatomical examination; (2) until the discovery of the parasite—first seen by KATSURA in a cat and by the author in man; (3) until the route of infection was discovered to be through the skin by experiments on calves in 1909; (4) until the discovery of the intermediate host (Fujinami unfortunately omits all reference to the work of LEIPER and ATKINSON at this period); (5) subsequent to that time, when eradication was commenced.

The author then discusses prophylactic measures under the headings of Protection of the skin against invasion, Destruction of the egg in the faeces, and Destruction of the cercaria and snails.

T. W. M. C.

MIYAGAWA (Yoneji). **Schistosomum Japonicum: its Life-History and Treatment with Stibnal.**—*Japan Med. World.* 1926. Sept. 15. Vol. 6. No. 9. pp. 229–232.

After a brief review of the life-cycles of the schistosomes, Miyagawa points out that in 1911 TSUCHIYA found that large doses of quinine hydrochloride injected intravenously killed the parasite. NISHI in 1921–23 used sodium antimony tartrate (Stibnal) in doses of ·005 gm. per kilo body weight in dogs but later found that a smaller dose was equally effective in the treatment of *S. japonicum*. The author has used the same drug successfully in man; lately, however, he has tried a slightly alkaline solution of the drug which he calls "Neostibnal" in place of the older acid preparation. This proved less toxic but equally efficient. The drug is very successful if given in cases that are not too far advanced.

R. T. L.

FULTON (Roland A. H.) with Addendum by BARNETT (L. E.). **Hydatid Disease in Man. A Clinical Study, with a Note on the Incidence of the Disease in New Zealand.**—*New Zealand Med. Jl.* 1926. Dec. Vol. 25. No. 130. pp. 317–323.

In the twelve years ending 1925, 90 cases of hydatid have been admitted to Dunedin general hospital, 75 of these being primary admissions, the remainder recurrent cases. Of the 90 cases, incorrect or no diagnosis was made in 50. The mortality was 23·3 per cent. No death, however, has occurred in clean liver hydatid where the "no-drain" operation has been employed. An analysis of the statistics for the whole of New Zealand shows that admissions have increased from 186 in the 1894–1898 period to 373 in the 1919–1925 period. Barnett estimates that approximately 150 cases occur yearly with a death rate of 15 per cent. 50 per cent. of all animals slaughtered are infected.

T. W. M. C.

SENEVET (G.) & WITAS (P.). Enquête sur l'échinococcose en Algérie. Première partie.—Les cas humains de kyste hydatique. [**Hydatids in Man in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Sept. Vol. 4. No. 3. pp. 343–456. With 2 folding maps.

DÉVÉ in 1923 (this *Bulletin*, Vol. 21, p. 556) investigated the problem of hydatid in Tunis and BAROTTE and VELU have performed a similar task for Morocco. The present writers have completed the survey of north Africa by their enquiry in Algeria. The first part of this forms the present paper and deals with the incidence in man in that area. They have calculated a "hydatid Index" for the various areas ($=\frac{\text{av. no. per year}}{\text{no. of inhabitants}} \times$ a million) for the period 1900–1925 and get an average figure of 15. The disease is commonest in the steppe-like regions of the high plateaux. Dévé has found that in similar regions in Morocco the heaviest infections were found. The maximum number of cysts was found between the ages of 10 and 30 years and the liver is most commonly infected.

T. W. M. C.

CAMERON (Thomas W. M.). **Some Modern Biological Conceptions of Hydatid.**—*Proc. Roy. Soc. Med.* 1927. Jan. Vol. 20. No. 3. pp. 272–283 (Sect. Trop. Dis. & Parasit. pp. 6–17). With 6 text figs.

This is a résumé of the most recent work on the life-history of the hydatid parasite and includes not only an account of the normal life cycle, but also discusses the formation of daughter cysts, bovine multilocular cysts and alveolar hydatid in man.

R. T. L.

HERCUS (C. E.). **Laboratory Aids in the Diagnosis of Hydatid Disease.** —*New Zealand Med. Jl.* 1926. Dec. Vol. 25. No. 130. pp. 323–335. With 1 diagram & 1 graph. [8 refs.]

This is a general discussion of the various laboratory tests for hydatid —microscopic and biological. The author does not use the precipitin test as he considers the complement fixation better. This is stated by the French workers to have a pre-operative value of only 20 per cent., by FAIRLEY to be over 90 per cent., and by the writer to be about 58 per cent. A small number of pseudo-positive results occur. He finds that its greatest value lies in testing post-operative cases to determine whether all the cysts have been removed by the surgeon. A strongly positive reaction persisting for a year after operation is absolutely diagnostic of the existence of another cyst. The intradermal test is over 90 per cent. accurate and is now used as a routine measure in Dunedin Hospital; a control injection of 1 per cent. peptone is essential to avoid pseudo-positive results. This test is useless for recurrent infections.

T. W. M. C.

HILES (I.). **Serological Studies on Hydatid.**—*Jl. Helminthology.* 1926. Nov. Vol. 4. No. 4–5. pp. 143–178. [118 refs.]

Miss Hiles reviews the literature dealing with the serological tests for the diagnosis of hydatid disease and concludes that the consensus of recent opinion is that the Casoni reaction is the most reliable. She conducted a series of experiments to investigate the value of the complement fixation test and the possibility of preparing a concentrated stock antigen, especially in countries where the cysts are not too common in domestic animals, to replace the fresh hydatid fluid used where they are prevalent. She found that alcoholic extracts of scolices were more potent than most hydatid fluids—especially those prepared from dried scolices. The possible interference of alcohol in the reaction is obviated by making very concentrated extracts which must be diluted greatly with saline before use. Slow emulsification and the addition of cholesterol enhanced the reaction.

T. W. M. C.

HILES (Isa). **Serological Tests for Hydatid Disease.**—*Proc. Roy. Soc. Med.* 1927. Mar. Vol. 20. No. 5. pp. 708–713 (Sect. Trop. Dis. & Parasit. pp. 26–31). [4 refs.]

Miss Hiles describes in detail the technique for carrying out the three standard tests for the presence of Hydatid (Complement fixation, Precipitin and Intradermal). The paper does not lend itself to abstraction and should be consulted in the original.

T. W. M. C.

ICHOK (G.). Le diagnostic de l'échinococcose à l'aide de l'intradermo-réaction. **[Diagnosis of Hydatid by the Intradermal Reaction.]**—*Presse Méd.* 1927. Jan. 26. Vol. 35. No. 8. pp. 118–119. [11 refs.]

This is a review of the recent work on the intradermal test for hydatid. The author concludes that it is superior to all the other reactions. Curiously enough, the reaction is reduced after a positive cutireaction for tuberculosis, but not after the injection of a variety of other substances, including anti-typhoid vaccine.

T. W. M. C.

SERIGÓS (Ernesto). Nuevo procedimento que permite obtener reacciones más sensibles. Posibilidad de descubrir quistes hidáticos de difícil diagnóstico. (Nota previa). **[Diagnosis of Obscure Hydatid Cysts.]**—*Semana Méd.* 1926. Nov. 18. Vol. 33. No. 46 (1714). pp. 1374–1375.

The author believes that the injection of hydatid fluid in the intradermal test should be into the skin in the region nearest to the hydatid focus ("proximal intradermal reaction"), since the reaction is much more pronounced there. The further the injection from the site of the cyst, the less severe the reaction ; by this means it is possible to locate a cyst otherwise difficult to diagnose.

T. W. M. C.

LEMAIRE (G.) & THIODET (J.). Résultats comparés des différentes méthodes biologiques de diagnostic des kystes hydatiques. Réaction de Casoni. **[Comparison of the Biological Methods of Diagnosis of Hydatids.]**—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 71–82. [3 refs.]

Four biological methods of diagnosing hydatid are in use at the present day, viz. ; (1) eosinophilia ; (2) complement fixation ; (3) precipitin reaction ; (4) the intradermal test, and the authors have made an interesting study of the comparative value of these. The second and the fourth give the smallest number of positive results which are not justified and they consider that they are of great use. The second is perhaps not sensitive enough regularly to confirm the clinical diagnosis, and it varies more than the others under the different antigenic properties of hydatid fluid. They find that it and the precipitin test give about 17 per cent. of positive results. The intradermal test, on the other hand, gives 87 per cent. of positive results and appears not only to be the most sensitive but the most useful for the clinician. They control this test with an intradermal injection of peptone broth.

T. W. M. C.

ESCUDERO (P.), ESCUDERO (A.) & PECO (G.). Sobre el valor de la intradermorreacción hidatidica. **[The Value of the Intradermal Reaction for Hydatids.]**—*Semana Méd.* 1926. Sept. 2. Vol. 33. No. 35 (1703). pp. 585–586. [2 refs.]

From experiments on 20 subjects, the authors conclude that the intradermal test for hydatid loses its value as a diagnostic test after the first injection, since injections into persons free from cysts render them positive to subsequent injections. They believe that the sero-reaction of Imaz-Lorentz is the only specific test.

T. W. M. C.

HOROWITZ-WLASSOWA (L.). Zur Frage des serologischen Nachweises der Echinokokkeninfektion. [**Serological Diagnosis of Echinococcus Infection.**]—*Deut. Med. Woch.* 1926. Jan. 22. Vol. 52. No. 4. pp. 147–148. [32 refs.]

The Ghedini-Weinberg reaction for the diagnosis of hydatid infection is successful in 90–95 per cent. of cases and seems to be strictly specific. The author finds that a pellucid hydatid fluid has no antigenic power and that even small doses of a cloudy fluid containing products of degeneration, are active. The antigen is lipoidal in nature and heating to 55° C. does not destroy it.

T. W. M. C.

PESSÔA (S. B.), DA SILVEIRA (G. Fleury) & CORRÊA (Clovis). Sobre a producção de anti-corpos especificos por meio de injecções experimentaes de extracto total de *Cysticercus cellulosae.* [**Production of Antibodies by Injection of Total Extract of** *C. cellulosae.*]—*Brazil-Medico.* 1926. Oct. 23. Year 40. Vol. 2. No. 17. pp. 235–236. [4 refs.]

Diagnosis of cysticercus infection in the laboratory is usually by deviation of the complement, the antigen being an aqueous solution of cysticerci. Other reactions (precipitin, eosinophilia) in the author's opinion have only a relative value. Hydatid is now often diagnosed by an intradermal test. The authors have adopted a similar technique for *Cysticercus cellulosae,* using an antigen prepared from cysts from the pig.

R. T. L.

PESSÔA (S. B.), DA SILVEIRA (G. Fleury) & CORRÊA (C.). Reacção do desvio do complemento na cysticercose a *Cysticercus cellulosae,* usando-se como antigeno extracto de *Cysticercus bovis.* [**Deviation of Complement in** *C. cellulosae* **Infection with Extract of** *C. bovis* **as Antigen.**]—*Brazil-Medico.* 1926. Dec. 18. Year 40. Vol. 2. No. 25. p. 347. [5 refs.]

The authors have injected extracts of *Cysticercus cellulosae* into rabbits and found that their serum gave positive results with either *C. cellulosae* or *C. bovis* as an antigen. Controls were negative. Similarly a man with *C. cellulosae* infection of the eye gave positive results with *both* antigens, while an uninfected man was negative.

T. W. M. C.

LEMAIRE, THIODET & DERRIEN. Sur la nature du poison hydatique. [**The Nature of the Hydatid Poison.**]—*C.R. Soc. Biol.* 1926. Dec. 17. Vol. 95. No. 37. pp. 1485–1487. [1 ref.]

The hydatid poison is not albuminous as it can be dialysed and the fluid so recovered is not affected by boiling. The addition of alcohol causes its precipitation as a white amorphous powder, easily soluble in distilled water, when it may be used for the intradermal reaction. The toxin appears to be a polypeptide. The authors recommend the use of dialysed hydatid fluid for the Casoni reaction instead of the entire fluid.

T. W. M. C.

COUTELEN (F.). Essai de culture *in vitro* de scolex et d'hydatides échinococciques (*Echinococcus granulosus*). [**Culture in vitro of Scolex and Hydatid.**]—*Ann. Parasit. Humaine et Comparée.* 1927. Jan. 1. Vol. 5. No. 1. pp. 1–19. With 2 figs. [24 refs.]

Coutelen has been able to keep scolices of Echinococcus alive in hydatid fluid for a month—under aerobic and partially anaerobic conditions—and finds that they increase to nearly thirty times their original size. Daughter cysts have been similarly kept alive for a week. The scolices will not live in an acid medium (the pH value of normal hydatid fluid is 7·4) and can live under a variety of conditions of temperature, the optimum being 37°–39° C.

T. W. M. C.

DERRIEN (E.). Porphyrines et vers parasites. [**Porphyrins and Parasitic Worms.**]—*C.R. Acad. Sci.* 1927. Feb. 21. Vol. 184. No. 8. pp. 480–481. [4 refs.]

" Ultraparaviolet " light causes, in the depth of the meat, cysticerci to glow with a red inflorescence (due to the presence of protoporphyrin), and it is suggested that this fact may be of value in diagnosis.

T. W. M. C.

NOVARO (Raúl). Hidatidosis hepática. [**Hydatid of the Liver.**]—*An. Inst. Modelo Clin. Méd.* Buenos Aires. 1924–25. Vol. 9. No. 1. pp. 70–89. With 13 figs.

This is the substance of a post-graduate lecture giving a general account of hydatid, its topographical and geographical incidence, its morphology and life history, the symptoms of the disease and its diagnosis by X-rays, biological methods and by the presence of eosinophilia. Special attention is paid to the intradermal test and an excellent coloured plate of this reaction is given.

T. W. M. C.

DÉVÉ (F.). Kyste hydatique et radiothérapie. [**Hydatid and Radiotherapy.**]—*Presse Méd.* 1927. Feb. 12. Vol. 35. No. 13. pp. 193–195. [20 refs.]

Dévé states that radiotherapy for hydatid infection, with the apparatus to-day available, is quite impossible—and this will probably be the case for some time.

T. W. M. C.

BACIGALUPO (Juan). *Hymenolepis intermedius* (nueva especie). Su evolución. [*H. intermedius* **n. sp.**]—*Semana Méd.* 1927. Jan. 27. Vol. 34. No. 4 (1724). pp. 229–230. With 2 text figs.

In studying the species of Hymenolepis in man and rats, the author has encountered a new species which he names *H. intermedius.* It is 5 to 12 cm. long with a scolex armed with 32 hooks (15–20$\mu$ long).

The active hexacanth embryo develops into a cystecercoid in *Tenebrio molitor.* Feeding this to white rats produced the adult. The author was also able to infect adult Tenebrios with *H. nana.* [It is not stated whether man or the rat was the original host of the new species.]

T. W. M. C.

GUNDRUM (F. F.) & SNYDER (J. R.). *Hymenolepis diminuta.* **Report of a Case.**—*California & Western Med.* 1927. Mar. Vol. 26. No. 3. pp. 350–351.

This is the record of an infection with *H. diminuta* in a child of 15 months. There were 8 worms in all and they caused symptoms of enteritis. The infection was possibly conveyed to the child through its father, who worked in a granary and may have brought the intermediate host home with him.

T. W. M. C.

HERSZKY (Paul). Bandwurm-Ileus. [**Tapeworm-Ileus.**]—*Deut. Med. Woch.* 1927. Jan. 21. Vol. 53. No. 4. pp. 144–145. With 2 text figs. [14 refs.]

Herszky records an impaction of the ileum with a specimen of *Taenia solium,* 3 metres long, which caused a spasmodic colitis. Removal of the worm relieved the condition.

BURNET (James). **A Case of Severe Chorea associated with Tapeworm, with Remarks on the Treatment of this Disease.**—*Lancet.* 1927. Mar. 19. pp. 600–601. [1 ref.]

After the expulsion of a tapeworm, the movements ceased in a case of chorea in a girl of 9½ years who was distinctly rheumatic.

BENEDICT (Edward B.). *Taenia saginata* **in the Gall Bladder.**—*Jl. Amer. Med. Assoc.* 1926. Dec. 4. Vol. 87. No. 23. p. 1917.

Benedict records the occurrence of a complete *Taenia saginata* in the gall-bladder of an old man. He was operated upon for acute chole cystitis and the tapeworm—ten feet long—removed. The patient was discharged 17 days after the operation.

R. T. L.

PRATES (Manuel Maximo) & PINTO (Francisco da Silva). Um curioso caso de helmintiase. [**An Unusual Case of Helminthiasis.**]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 4. 6a, 7a e 8a Sessões.) 1923. Aug. No. 4. pp. 389–395.

The authors record an infection with *Dipylidium caninum,* the tapeworm when expelled measuring 55 cm. in length. Radical cure with Male fern proved difficult.

T. W. M. C.

SCHNEIDER (Hans). Weitere Erfahrungen ueber die Bandwurmkur mittels der Duodenalsonde. [**Further Experiences in the Treatment of Tape Worm by means of the Duodenal Sound.**]—*Muench. Med. Woch.* 1926. Aug. 20. Vol. 73. No. 34. pp. 1403–1407. [2 refs.]

Schneider has now administered male fern to a second series of 87 patients infected with Taenia with 62 successful results (see this

*Bulletin*, Vol. 21, p. 554) and finds that administration with the duodenal sound is superior to the more usual " Capsule " method.

T. W. M. C.

KOGAN (D. A.). Zur Technic der Behandlung der Bandwürmer mit der dünnen Magensonde. [**Technique of Treatment of Tape Worm with the Stomach Sound.**]—*Jl. Méd. de l'Asie Centrale.* Tashkent. 1926. Vol. 5. No. 1. German summary p. 36. [In Russian pp. 31–35. 2 refs.]

By the administration of male fern through the duodenal sound tapeworms, with rare exceptions, are expelled. Male fern when administered by this method is given in the usual dosage.

R. T. L.

CASAUX & HOUDEMER. Note préliminaire sur les sparganoses humaines et animales au Tonkin. [**Human and Animal Sparganoses in Tonkin.**]—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 802–804.

Sparganum in man and animals is relatively common in Tonkin. 80 per cent. of the frogs are infected while snakes and a civet were also heavily parasitized. Other common hosts are the pig, monkey, rats and numerous species of birds. Each year 7 or 8 cases of human ocular sparganosis are treated at Hanoi. Infection is probably from the cyclops. Cats are infected with the adult to the extent of 14·2 per cent., dogs to 12·1 per cent.

The parasite lives for preference in the connective tissue of animals and the orbit of man. The first are not capsulated and cause no symptoms: the second are capsulated, cause a considerable reaction, and are very active.

T. W. M. C.

KRAUSE (E.). **About** *Bot[h]riocephalus Latus.—Harefuah.* Jerusalem. 1926. Oct.–Nov. Vol. 2. No. 1. English summary pp. VII–IX. [In Hebrew pp. 328–330.]

Previous to the author's work, only one case of Bothriocephalus infection had been recorded from Palestine—and that from Jerusalem. She records two cases from Haifa—one at least of which had apparently been contracted from Lake Tiberias, where the " Barbus " and *Perca fluviatilis* occur.

R. T. L.

MACDONAGH (Emiliano J.). Parásitos de peces comestibles. II.—Larvas de un cestode trypanorrinchido de la pescadilla. [**Parasites of Edible Fishes. II. Larvae of a Trypanorrinchid Cestode from the Pescadilla.**]—*Semana Méd.* 1927. Feb. 10. Vol. 34. No. 6 (1726). pp. 373–376. With 7 text figs.

The pescadilla (*Cynoscion striatus*) [a member of a large group of edible fishes often very incorrectly known as " sea trout "] is commonly eaten in South America. It is often parasitized by the large larvae of a Trypanorrinchid cestode which is here described in some detail. These larvae are innocuous to man, and although they might be mistaken for plerocercoids of Bothriocephalus, they are easily distinguished by the shape of the head.

T. W. M. C.

STEPANOW-GRIGORIEW (J.) & HOEPPLI (R.). Ueber Beziehungen zwischen Glykogengehalt parasitischer Nematodenlarven und ihrer Wanderung im Wirtskörper. [**Relation between Glycogen Content of Parasitic Nematodes and their Migrations in the Host.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 577–585. [18 refs.]

The writers have estimated histologically the glycogen content of the larvae of Ascaris, Strongyloides and *Uncinaria stenocephala* of the dog in order to test PINTER'S hypothesis, with which they agree, that these larvae migrate into the blood-stream on account of their need for this substance. They find that in the egg of Ascaris, the embryo in the egg and the larva from the lung, glycogen is present. There are traces in the gut of the young infective larva of Strongyloides which decrease as it grows older; traces are also found in the free-living generation. In larvae of Uncinaria which had grown experimentally in the gut of a tracheotomized dog and which had not passed through the blood stream, traces could also be found.

T. W. M. C.

FÜLLEBORN (F.). Hautquaddeln und "Autoinfektion" bei Strongyloidesträgern. [**Skin Wheals and "Autoinfection" in Strongyloides Carriers.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Dec. Vol. 30. No. 12. pp. 721–732. [13 refs.]

The penetration of human skin by individual larvae of *Strongyloides stercoralis* causes a transient itching which rapidly disappears. Only a proportion of the larvae succeed in penetrating the skin: where the skin is tender this is easier than where it is thick, and it is easier in young than in old people. In a man (the writer) of 59 years of age, a larva penetrated the skin of the forearm only where the epidermis was broken.

In an experiment on a person who had already been a Strongyloides carrier for many years, there developed, with severe itching, large urticarial-like wheals which within a few hours extended along the skin and which obviously had been caused by larvae creeping further inside the skin. After these wheals have disappeared for weeks, they can be provoked again simply by rubbing the skin at the old spot.

After the skin had been penetrated by the larvae at the tip of the fingers, the whole of the anterior surface of the hand gradually swelled, and violent itching—mostly nocturnal—appeared which lasted for a week or longer.

In nearly all the Strongyloides carriers observed by Fülleborn, there occasionally occurred in the anal region large itching urticarial wheals, obviously the result of penetration of the skin in this region by the larvae which have developed in minute traces of faecal material remaining at the anus. The skin for this reason, and because of repeated infections, seems to acquire a strong local hypersensitivity. In a carrier spontaneously suffering from these wheals, similar wheals could be produced experimentally by introducing Strongyloides larvae into the anal cleft. Moreover, inoculation of the skin of the forearm with an antigen consisting of powdered Strongyloides larvae caused the formation of similar wheals in all the cases observed by Fülleborn.

This penetration of the skin of the anal region by the larvae must give rise to a permanent new infection and may be the cause of the long persistence of the infection in the intestine: in one of Fülleborn's cases, this persisted for 24 years. He can give no other explanation. Experiments with larvae of *Rhabdias bufonis*, which lives in the lung of the frog, suggest that in hosts infected with species belonging to this group of Nematodes some substance may develop which can inhibit the further development of the young of these parasites inside the body of the host.

T. W. M. C.

FÜLLEBORN (F.). Spezifische Kutanreaktionen bei Infektion mit Strongyloides und anderen Helminthen. [**Specific Skin Reactions in Infestation with Strongyloides and other Helminths.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Dec. Vol. 30. No. 12. pp. 732–749. With 3 text figs. [25 refs.]

Fülleborn finds that inoculation with an antigen prepared from powdered infective larvae of *Strongyloides stercoralis* has proved to be a very convenient and useful diagnostic method in infection with this parasite. A similar but less powerful reaction is also given by an antigen prepared from the free-living sexual generation.

The skin reaction for Strongyloides appears also when Ascaris or Trichinella antigens are used: but skin reacting to Ascaris antigen is not sensitive to Strongyloides antigen. In the presence of a general skin allergy (i.e., in a positive reaction to intradermal inoculation with extract of human "scalp-scales," according to VAN LEEUWEN) there may be a positive reaction to Strongyloides antigen although the patient does not harbour the parasite.

Apart from this exception, it appears that a positive infection with Ascaris antigen indicates an Ascaris infection. But as this reaction may apparently remain positive for years after the parasites have been expelled, its value for diagnostic purposes is very slight. In strong Ascaris reactions, the skin appears to become sensitive to Trichinella antigen also.

Fülleborn finds that an acquired hypersensitivity, in persons working with Ascaris material, could not be transferred by means of the blood to guineapigs.

He was not successful in producing swellings by inoculations with powdered *Loa loa* into a patient predisposed to Calabar swellings, although these are obviously a reaction of the host's body to Loa antigen. However, he considers that this experiment requires repetition.

He concludes by discussing the practical value of intradermal tests for helminthic infections. With the exception of the Casoni reaction for hydatid, they do not appear to be very reliable. The specific reaction for Strongyloides is very useful but is still without any considerable practical importance. He considers that the following reactions may be of value: a cutaneous reaction for *Cysticercus cellulosae* infection, or for chronic trichinosis, or in incipient bilharziasis—in the latter theoretical conditions for its success are apparently favourable. In other cases, too much reliance cannot yet be placed on the diagnostic value of skin-reactions.

T. W. M. C.

FÜLLEBORN (F.). Demonstration ueber Kutanreaktion bei Helminthenaffektionen. [**Demonstration of Skin Reactions in Helminth Infections.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 86–87.

Pulverized infective larvae of Strongyloides rubbed into skin abrasions of seven Strongyloides patients supersensitized by long infection caused a marked urticaria rash in a few minutes. (This was quite distinct from the nettle rash arising spontaneously in such persons as the result of reinfections due to uncleanly habits.) This cutaneous reaction appeared specific (the controls were negative) and to be more reliable than the cultivation procedure. A slight rash, however, was also produced using a similarly prepared Ascaris antigen.

The results suggest that similar methods might prove of practical value in diagnosis of other helminthic infections.

R. T. L.

MAZZA (Salvador) & COSSIO ETCHECOPAR (Máximo). Consideraciones sobre un foco de anguilulosis en la provincia de Tucumán. [**A Focus of Strongyloidosis in Tucuman.**]—*Bol. Inst. Clin. Quirurg.* Buenos Aires. 1926. No. 14, 15 & 16. 7 pp. With 1 text fig. [5 refs.]

Near Tucuman there is a small focus of *Strongyloides* infection, 10 to 12 per cent. of the population being infected. Many of the infected persons showed clinical symptoms—repeated diarrhoeal crises and slight anaemia, sometimes with an itching eruption resembling purpura.

R. T. L.

ROBITSCHEK (Walter). Invasion von *Strongyloides intestinalis* in den Urogenitaltrakt. [**Invasion of the Urogenital Tract by** *S. intestinalis.*] —*Cent. f. Bakt.* I. Abt. Orig. 1927. Feb. 5. Vol. 101. No. 6-7. p. 419.

Robitschek records a case of infection of the urino-genital tract of a patient of 55 years with *Strongyloides intestinalis.*

R. T. L.

ORTLEPP (R. J.). **On the Identity of** *Physaloptera caucasica* **v. Linstow, 1906, and** *Physaloptera mordens* **Leiper, 1908.**—*Jl. Helminthology.* 1926. Nov. Vol. 4. No. 4–5. pp. 199–202. With 3 text figs. [2 refs.]

*Physaloptera mordens* differed very considerably from v. LINSTOW's description of *P. caucasica*, the other human species. In view, however, of SCHULZ's description of the type of the latter species (this *Bulletin*, Vol. 23, p. 254) Ortlepp has re-examined the types of *P. mordens* and finds that they are identical. The latter name accordingly becomes a synonym of *P. caucasica.*

T. W. M. C.

LEE (C. U.). **Filariasis Investigations in the Province of Kiang Su, China.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 279–287. With 1 map, 1 plate & 1 chart. [8 refs.]

An endemic area of *Filaria bancrofti* exists in Hsüchowfu and Lee has made a brief investigation of this centre. According to local information elephantiasis does not occur on the south side of the Yangtze at Chinkiang, although it is not uncommon on the north side. In

Hsüchowfu the filarial rate is 3·8 per cent., and cases of clinical filariasis are rare: in Tsing Kiang Pu it is 15·9 per cent. and cases are common; yet numerous cases of elephantiasis were seen in both areas.

Lee points out that the determination of the species of mosquito used by MANSON in his original work at Amoy has never been verified. It has been assumed that *Culex fatigans* is the only Chinese vector. In the above districts this species was absent, while *C. pipiens* was common and was frequently found infected. Some excellent microphotographs of these stages in the mosquito are given.

R. T. L.

GOMPERTS (H. C.). Aanteekeningen betreffende Filaria-onderzoek onder verschillende bevolkingsgroepen in Nederlandsch-Indië. [**Filarial Findings in Different Population Groups in Dutch East India.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 5. pp. 598–602. [2 refs.]

FLU (1916) found that 23·4 per cent. of the prisoners at Weltevreden harboured *Microfilaria bancrofti,* those coming from Batavia having a 3 per cent. infection. Gomperts has examined 708 persons at Soekaboemi and, grouping them according to their origin, finds an infection of 18 per cent. at Atjehers. A similar examination at Bandoeng in 1922 showed that while none of the residents were infected, imported Chinese labourers showed a 4·3 per cent. infection. There was no infection among the Madoereezen at Soerabaia in 1925.

It is recognized that only about 10 per cent. of infected persons show symptoms; but the author found no symptoms at all among the infected at Soerabaia. He considers that this is due to "physical selection," all the Chinese there being either soldiers or labourers who must be fit or would otherwise be deported.

He finds that the larvae will develop in *Culex fatigans* at an optimum temperature of 25° C. but can develop at lower temperatures as at Bandoeng, where complete development takes 14 days.

T. W. M. C.

HUGHENS (H. V.). **Filariasis. Report on 1,742 Persons observed in St. Croix, Virgin Islands.**—*U.S. Nav. Med. Bull.* 1927. Jan. Vol. 25. No. 1. pp. 111–117. With 1 chart in text.

Hughens is impressed with the large number of persons suffering from elephantiasis in the Virgin Islands and he believes that the incidence of infection depends on the prevalence of *Aëdes variegatus* and the repeated inoculation of persons by the infected mosquitoes over a long period. The lowered resistance about puberty seems to be a contributing factor to the appearance of the microfilaria in the blood. There is a considerable drop in clinical manifestations between the ages of 14 and 25, which, however, subsequently rises, and it is suggested that this fall and rise may be due to blocking of the lymphatics by adult Filaria worms and subsequent reinfection.

R. T. L.

KORKE (Vishnu T.). **Observations on Filariasis in some Areas in British India. Preliminary Investigation.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 717–732. With 15 figs. on 1 plate. [9 refs.]

Of 166 cases examined in Bihar and Orissa, Korke finds that 19 per cent. show microfilaria in the blood, not all of which agree in his opinion with the standard conception of *M. bancrofti.*

SUGANUMA (S.). **A Case of Teratoid Tumor, in which** *Filaria bancrofti ?* **was found.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1927. Jan. No. 262. English summary p. 4 [In Japanese.]

A tumour recovered from the abdomen of a child of six months contained pieces of a nematode which may have been *F. bancrofti.* The surrounding tissues showed inflammatory infiltration and a tendency to malignant changes.

ZIEMANN (Hans). Ein Fall von Filaria-loa-Infektion mit mindestens 17 jähriger Dauer. [**A Case of Loa Infection of at least 17 Years' Duration.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 626–628. [1 ref.]

Ziemann records a case of *Loa loa* infection which apparently persisted for at least 17 years without causing clinical symptoms.

R. T. L.

VOGEL (H.). Beiträge zur Anatomie der Gattungen *Dirofilaria* und *Loa.* [**Morphological Study of the Genera** *Dirofilaria* **and** *Loa.*]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Mar. 8. Vol 102. No. 1-3. pp. 81–89. With 13 text figs. [7 refs.]

This is a morphological description of *D. immitis* and *D. repens* of the dog and *Loa papionis* v *St. pauli* of *Ateles paniccus* from South America. The tail of the male *Loa loa* is also figured.

T. W. M. C.

BLACKLOCK (D. B.). **The Insect Transmission of** *Onchocerca volvulus* **(Leuckart, 1893), the Cause of Worm Nodules in Man in Africa.**—*Brit. Med. Jl.* 1927. Jan. 22. pp. 129–133. With 2 text figs. [10 refs.]

The detailed information on which this paper is based has already been noticed (this *Bulletin,* Vol. 23, p. 762). Blacklock in this general lecture states that over 45 per cent. of the inhabitants of Konno (Sierra Leone) are infected but only 40 per cent. of those infected possess nodules: 16 per cent. of these who had nodules did not appear to be infected. The larvae, ingested by *Simulium damnosum,* leave the gut within twenty-four hours, and within forty-eight hours have reached the thorax, by which time they have become stumpy forms with a characteristic caudal appendage. After several moults, they pass to the head and proboscis—about seven or more days after infection. Heavy infections appear to be fatal to the insect. The Simulium is found in shady parts near water and prefers to feed mainly when the sun is low, and bites especially below the waist.

Blacklock discusses the central American form and suggests that the frequent appearance of cephalic nodules there may be due to the fact that coffee is grown under overhead shade and the workers usually wear trousers and footwear.

T. M. W. C.

FÜLLEBORN (F.). Zur Onchocerca-caecutiens-Frage. [**The** *Onchocerca caecutiens* **Question.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. May 1. Vol. 30. No. 5. pp. 189–195. [7 refs.]

This article contains the summary of a lecture given at the International Conference of Hygiene at Kingston, Jamaica, in 1924 in order to make clear certain points which had been misinterpreted. In Onchocerca cases with eye symptoms, the author does not consider that the facts so far available justify the conclusion that improvement of vision is directly associated with excision of the nodules, although that they were in some way connected seemed clear. In his experience the majority of nodule carriers were healthy people, and he could not connect the filarial nodules with the disease "erysepelas de la costa."

R. T. L.

FAUST (Ernest Carroll). *Thelazia* **Infection of Man and Mammals in China.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 365–369. With 2 plates. [12 refs.]

Faust has examined specimens of Thelazia from man and from dog and agrees with LEIPER'S conclusion that all belong to the same species—*T. callipaeda.* The male is described for the first time and the rabbit is recorded as an additional host. *T. rhodesi* is recorded from the cow in China.

T. W. M. C.

YAMAGUCHI (Sachyu). Ueber die durch Larven von *Ascaris lumbricoides* und *Strongyloides stercoralis* in Gehirn und Nieren verursachten Veränderungen. [**Changes in Brain and Kidney caused by Larvae of** *A. lumbricoides* **and** *S. stercoralis.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Oct. 15. Vol. 29. No. 10. pp. 589–604. With 1 text fig. & 7 figs. on 1 plate. [11 refs.]

Haemorrhages into the renal tubules may be caused by larvae boring out of the capillaries of the cortex, or from the arterial rete mirabile of the glomerulus, in which case blood flows into the upper part of the coiled tubules. In only a small percentage of animals infected by feeding with ripe eggs of Ascaris could blood be traced to the latter origin. But when infective larvae of *Strongyloides stercoralis* were injected into the carotid artery near the heart, and the kidney removed immediately after the first appearance of bleeding, the percentage was considerable, while it was less if removal was done an hour afterwards. This was probably because the blood was quickly pushed out into the tubules under the normal pressure of the glomerulus. Bleeding into the tubules was found to be most extensive in the superficial layers of cortex and in the region supplied by the end branches of the arteriae interlobulares.

The haemorrhages caused by the larvae in the capillaries of the brain substance itself were found to be very slight indeed, even in heavy infections, but might be fairly extensive in the meninges and perivascular lymph spaces. This is probably due to the fact that it is easier to bleed into spongy tissue or liquid filled spaces than into firmer tissue, such as the brain substance.

In both brain and kidney the author found the ecdysed sheaths of the larvae.

R. T. L.

ALCARAZ (Ramón A.). La evolución del áscaris lumbricoides en los animales de laboratorio. [**Development of** *A. lumbricoides* **in Laboratory Animals.**]—*Semana Méd.* 1926. Dec. 16. Vol. 33. No. 50 (1718). pp. 1632–1634. With 1 text fig.

After a review of modern conceptions of the life-history of Ascaris, the author draws attention to the observation by LUTZ in 1888 in Brazil, of what were then considered to be accidental pulmonary lesions in a patient suffering from ascaris infection. The author has experimentally infected guineapigs with human ascaris eggs and produced a typical pneumonia in 6–8 days after infection.

T. W. M. C.

CALDWELL (Fred C.) & CALDWELL (Elfreda L.). **Are** *Ascaris lumbricoides* **and** *Ascaris suilla* **Identical?**—*Jl. Parasit.* 1926. Dec. Vol. 13. No. 2. pp. 141–145. [8 refs.]

The authors find in Alabama that, although ascaris infection in pigs amounts to 45 per cent. and conditions are favourable for human infection from this source, infection in man is only 1 per cent. They conclude that this epidemiological evidence supports the theory of non-identity of the two forms.

T. W. M. C.

MUZII (Mario). Diagnosi radiologica dell' ascaridiosi. [**Diagnosis by Radiology of Ascariasis.**]—*Policlinico.* Sez. Prat. 1927. Jan. 17. Vol. 34. No. 3. pp. 83–85. With 3 text figs.

Muzii records three cases of ascariasis which were diagnosed by means of X-rays after a barium meal. Three skiagraphs are given. [The method does not appear to be superior to the more usual technique of examining the stool for the presence of ova.]

T. W. M. C.

SCHARPFF (W.) & SCHNELLER. Die Askaridenkur mit Oleum Chenopodii bei Erwachsenen. [**Cure of Ascariasis in Adults by Oil of Chenopodium.**]—*Muench. Med. Woch.* 1926. Apr. 23. Vol. 73. No. 17. pp. 693–695. [14 refs.]

Regular results were obtained by a two days' cure only, with three administrations of oil of chenopodium each day. The dose used was 10, 12, or 16 drops, according to the age, sex, weight and general condition of the patient. The best precautions against risk of poisoning were : Conduction of the cure on two successive days, thorough clearing of the gut before treatment and each evening of the cure, suitable dosage of the medium and stoppage of the drug in all cases of fever, chronic disease and weakness. The above method has been in use in the Tübingen Clinic for over two years. No cases of poisoning have occurred.

R. T. L.

RICO (J. Toscano). Sur les propriétés anti-helminthiques de l'*Allium sativum.* [**Anthelmintic Properties of** *Allium sativum.*]—*C.R. Soc. Biol.* 1926. Dec. 31. Vol. 95. No. 38. pp. 1597–1599. With 2 text figs. [6 refs.]

——. L'action des crésols sur l'*Ascaris lumbricoides.* [**Action of Cresols on** *A. lumbricoides.*]—*Ibid.* With 4 text figs. [8 refs.]

Rico has tested the action of *Allium sativum* on ascaris *in vitro* and finds that it produces a complete paralysis of the muscles. The anthelmintic action of the drug is due to sulphate of "allyle." Similarly he has tested ortho- meta- and para-cresol and finds the latter the most active.

T. W. M. C.

VALERIO (Americo). A proposito de uma observação de meningite ascaridiana. [**A Case of Ascaridial Meningitis.**]—*Brazil-Medico.* 1926. June 12. Year 40. Vol. 1. No. 24. pp. 309–310.

A case of meningitis in a child who vomited Ascarids is described. His faeces contained ova of Taenia, Whipworms and Ascarids. Many Ascaris worms were passed after anthelmintic treatment, and the author discusses the possibility of a toxin being responsible for the nervous symptoms. He believes that this was a case of "verminous meningitis."

JONA (Augusto). Meningite tubercolare ed ascaridiosi. [**Tuberculous Meningitis and Ascariasis.**]—*Riforma Med.* 1926. Feb. 22. Vol. 42. No. 8. pp. 172–174. [12 refs.]

This is a note of four cases of tubercular meningitis in which Ascaris were simultaneously found. The author points out that these worms are often expelled during a febrile attack and he discusses the nervous symptoms produced by them. The possibility of a verminous toxaemia facilitating the action of the tubercle bacilli is suggested.

R. T. L.

CAPECCHI (Egisto). Pseudo-peritonite cronica da ascaridi. [**Chronic Pseudo-Peritonitis due to Ascarides.**]—*Riforma Med.* 1926. June 28. Vol. 42. No. 26. pp. 619–620.

This is a case of a girl of 15 with symptoms of chronic peritonitis in whom an exploratory laparotomy showed the perforation of the intestine with numerous Ascarids.

T. W. M. C.

ROW (Y. S.). **A Case of Ascaris Infection simulating Cholera.**—*Indian Med. Gaz.* 1927. Feb. Vol. 62. No. 2. p. 87.

As the patient showed symptoms resembling cholera two pints of hypertonic salt solution with glucose and adrenalin were administered intravenously. The symptoms subsided but Ascaris infection was diagnosed. Since treatment with santonin and the expulsion of 164 worms, the symptoms have not recurred.

R. T. L.

IKUJI (Ken). [**Statistics of Ascariasis among Children and on the Influence of Ascariasis on the Nourishment of the Children.**]—*Jikwa Zasshi* (*Jl. of Pediatrics*). 1926. Feb. No. 309. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. p. 360.]

The author records the presence of *Ascaris* and *Trichocephalus* in suckling babes.

T. W. M. C.

MURRAY (H. E.). [*Ascaris lumbricoides* **in Fallopian Tube.**]—*Jl. Obstetrics & Gynaecology of British Empire.* Manchester. 1926. Autumn. Vol. 33. p. 448. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Dec. 18. Vol. 87. No. 25. pp. 2128–2129.]

Murray records the occurrence of Ascaris in the fallopian tube.

CARSTEN (Max). *Ascaris lumbricoides* in der Blase. [*A. lumbricoides* **in the Bladder.**]—*Deut. Med. Woch.* 1927. Mar. 4. Vol. 53. No. 10. p. 411.

Carsten records a case of infection of the bladder by *Ascaris lumbricoides*, eggs being found in the urine.

R. T. L.

KOCH (Ernst Walther). Oxyurenfortpflanzung im Darm ohne Reinfektion und Magenpassage. [**Multiplication of Oxyuris in the Bowel without Reinfection or Passage through the Stomach.**]—*Cent. f. Bakt.* 1. Abt. Orig. 1925. Feb. 18. Vol. 94. No. 3-4. pp. 208-236. With 6 text figs. & 1 plate. [9 refs.]

From observations of ten children suffering from Oxyuris infection, it was found that the outward migration of worms occurred in the early hours of sleep and lasted for about three hours, 65 being the largest number of worms observed in this period. Egg-laying occurred almost immediately and was complete in 15-20 minutes, the time taken depending on the moisture present. In two hours as many as 16 out of 43 worms were seen to penetrate to the female genitalia. In no case was a worm observed to wander back into the bowel. It appeared that the outward wandering of the pregnant females was a purely passive action brought about mechanically by the extension of the uterus into the head end, thus flattening the sucking pharynx and causing the animal to lose its hold on the mucous membrane. This explained the disproportion of males and females outside the body, for in the male the testes did not extend anteriorly. Immature forms which possessed neither lip membrane nor sucking pharynx were liable to be passed out with the faeces. Experiments showed that oxygen was not essential either for egg-laying or for development of the egg.

That Oxyurids may develop in the gut without reinfection and without passage through the stomach was shown by the author, who succeeded in infecting a child by injecting adult females into the body by means of an enema. Elaborate precautions were taken to prevent reinfection by the mouth, and it was found that the worms actually multiplied in the intestine.

R. T. L.

SCHRÖPL (Ernst). Hautproben mit Oxyurenextrakt. [**Skin Tests with Oxyuris Extract.**]—*Deut. Med. Woch.* 1926. Sept. 3. Vol. 52. No. 36. p. 1508.

Using alcohol extracts of fresh Oxyuris, Schröpl injected 35 patients and finds that not only is there a local reaction, but a state of change in the whole body results. He believes that the parasite secretes a toxin and that the frequency of the parasite, especially in older children, and its connexion with various still obscure common complaints, should be investigated.

R. T. L.

SILIANSKI (L.). Zur Behandlung der Oxyuriasis. [**Treatment of Oxyuriasis.**]—*Deut. Med. Woch.* 1926. Feb. 26. Vol. 52. No. 9. p. 366.

Powdering with Vasolenoform powder was found to sooth the irritation in oxyuriasis and to prevent development of eggs by depriving them of moisture. This treatment cured the author himself of the infection and was successful in two of three children treated by Dr. LUBINSKI. It has yet to be proved whether treatment with Vasolenoform alone suffices in severe intestinal cases, and whether the action of the formaldehyde in the Vasolenoform is specific for the worm eggs.

R. T. L.

KARPELES (F.) & BLUM (K.). Zur Klinik der Trichinoseerkrankungen. [**Symptomatology of Trichinosis.**]—*Med. Klin.* 1926. Aug. 20. Vol. 22. No. 34 (1132). pp. 1289–1293. [4 refs.]

The authors record in detail the symptoms and blood pictures of five Trichina patients and discuss the cases. They conclude that the cardinal symptoms of trichinosis are muscle pains, trismus, fever, and the appearance of the diazo reaction whereas the eosinophilia is unreliable. Mortality is about 33 per cent. The favourable course in children is unexpected; they never die from the disease. Prognosis is grave; diagnosis can only be certain if a piece of excised muscle is examined microscopically. Treatment is symptomatic and calcium should be given by mouth and intravenously.

R. T. L.

OUDENDAL (A. J. F.). **About Changes of the Mucous Membrane caused by** *Trichocephalus dispar.*—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 333–344. With 11 coloured figs.

CHRISTOFFERSEN suggested that the head of Trichocephalus bores into the intestine and thus forms tunnels. Oudendal cannot accept this suggestion and believes that the long neck fixes itself by " rolling " in the superficial epithelium. It is never found deeper than the mucous layer. The neck becomes surrounded by a giant cell, which comes to line the tunnel and probably originates from the mucosa itself. The parasite often enters a glandular duct and by twisting on itself becomes surrounded by the intertwined epithelial cells in which eosinophil cells congregate. The article is accompanied by a number of excellent coloured plates of sections of the parasite in situ.

T. W. M. C.

GERMAN (S. G.). **Cases of** *Trichostrongylus instabilis* **in the City of Saratov.** —*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 4. English summary p. 335. [In Russian pp. 285–289. 16 refs.]

Out of 2,269 persons examined in Saratov, *Trichostrongylus instabilis* was found in 16, mostly school children.

T. W. M. C.

STILES (Charles Wardell). **Light Hookworm Infection: should Patients be "advised that they are Carriers but do not need Treatment"?**—*Jl. Amer. Med. Assoc.* 1927. Feb. 12. Vol. 88. No. 7. pp. 455–456. [2 refs.]

Recently hookworm investigations have become more and more mathematical and attempts have been made to estimate the number of adult worms harboured on the basis of an egg count. SMILLIE and AUGUSTINE have recently attempted to classify infected persons (irrespective of clinical symptoms) as carriers (under 100 worms) and as patients (over 100 worms). Carriers are to be advised that treatment is unnecessary. Stiles holds that since infections produce both objective symptoms (which are measurable) and subjective symptoms (which are not), an estimated number of worms is not a safe criterion. He believes that these researches are being pushed to an illogical extreme.

R. T. L.

CASTILLO ODENA (Isidro). Anquilostomiasis. [**Ancylostomiasis.**]—*Semana Méd.* 1927. Feb. 10. Vol. 34. No. 6 (1726). pp. 356–366.

Hookworm disease is serious in the province of Corrientes, 90 per cent. of the inhabitants being infected in parts. Treatment was by means of a mixture of carbon tetrachloride (2 parts) and oil of chenopodium (1 part), 2·4 cc. per adult being given simultaneously with magnesium sulphate. Complementary measures were construction of latrines, education and propaganda, including a sanitary campaign. Other parasites found were Ascaris, Oxyuris, whipworm and Taenia.

T. W. M. C.

SOPER (Fred L.). **The Report of a Nearly Pure** *Ancylostoma duodenale* **Infestation in Native South American Indians and a Discussion of its Ethnological Significance.**—*Amer. Jl. Hyg.* 1927. Mar. Vol. 7. No. 3. pp. 174–84. [24 refs.]

Soper has examined 70 natives of the Chaco in Paraguay and finds that they shew an *Ancylostoma* : *Necator* ratio of 13 : 1. As both species were originally imported to America from the Old World, he deduces from this that, either the *Necator* element of an originally mixed infection has died out under circumstances favourable for the *Ancylostoma* element, or that the *Ancylostoma* infection antedates the *Necator*. He believes that the latter is the case and that, while *Ancylostoma* was present before the Spanish conquest, *Necator* is of very recent introduction. He concludes that the "Amerind" race originated in Asia or Indonesia, north of latitude 20°N. and probably reached America via the Pacific.

T. W. M. C.

SCHÜFFNER (W.). Zahlenmässige Unterschiede bei Nekator und Anchylostoma. [**Statistical Differentiation of Necator and Ancylostoma.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Sept. 13. Vol. 30. No. 9. pp. 534–544. With 1 text fig. [8 refs.]

This is a statistical examination of the varying proportions of Ancylostoma and Necator infecting different races of peoples, of the relative numbers of each sex present, of the relative actions of different drugs (thymol, chenopodium, carbon tetrachloride) on the different species, and of the relative danger from each species.

In Java, Paraguay and certain parts of India, the proportion of Ancylostoma is low compared with Necator; while in China and

Calcutta the proportion is high (about 1 : 2). The number of males is relatively greater in Ancylostoma than in Necator, although in both cases the females predominate. A single pair of Necators weigh about 2 mgm., while a pair of Ancylostomas weigh 4 mgm. ; from this the author deduces that the latter species must be about twice as dangerous as Necator.

T. W. M. C.

HASLAM (J. F. C.). **A Short Hookworm Campaign in the Pomeroon District, British Guiana.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 354-356.

A mixture of races inhabits the lower reaches of the Pomeroon River and, in 1925, it was decided to conduct a brief but vigorous hookworm campaign in this area. After a preliminary burst of effective publicity, 1,500 containers were distributed and of these 1,200 were returned with specimens. In all 1,373 persons received treatment. Dr. Haslam and a dispenser attended at four different centres in this area and at each received from the assembled people their sample of faeces and to them administered carbon tetrachloride (45 m. for an adult, children *pro rata*) without any special previous preparation and with no consequent injunctions except the avoidance of "alcoholic indiscretion." Examination of the faeces submitted shewed that about 66 per cent. suffered from hookworm, 64 per cent. from Ascaris and 27 per cent. from whipworms. Although no subsequent records were kept, local reports proclaimed the success of the campaign, which occupied the space of six days ; and it is proposed to repeat it every six months and at the same time improve the general sanitary conditions. It is suggested that, apart from the desirability of removing all ascarids, it would be of advantage to add chenopodium to the $CCl_4$, for the passage of hookworms is often unnoticed while the passage of ascarids makes a great impression, increasing the popularity of such campaigns.

T. W. M. C.

CHANDLER (Asa C.). **The Prevalence and Epidemiology of Hookworm and other Helminthic Infections in India. Part VI. Burma. Part VII. Bihar and Orissa. Part VIII. United Provinces of Agra and Oudh.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 733-744. With 1 map. [2 refs.] ; 745-759. With 1 map. [6 refs.] ; 761-773. With 2 maps. [4 refs.]

*Part VI. Burma.* Continuing his topographical survey of hookworm infection and other helminthic infections (*ante,* pp. 190-2) Chandler finds that hookworm infections vary a great deal throughout the country. The minimum infection is in the dry centre (Infection Index under 50) while the Shan States, where shoes and sandals are worn, have an index of 100-150. Along the coast the infection is fairly high (1 per cent., 150-250) while in a few places, near Kamayut and Prome it rises to nearly 450, greater than anywhere in Bengal or Assam. In the flooded Delta and coast divisions, the infection is fairly severe among Indians who do not use latrines, but these are in fairly general use there, although nowhere else in the country. The climate on the whole is suitable for hookworm infections, the rainy season lasting from May to October, while the delta and the coast become flooded and so lengthen the hookworm season to eight months. The temperature is never extreme. JOLLY has examined jails in Burma and finds that 5·6 per cent. of the hookworms are *A. duodenale,* 2·5 per cent. *A. braziliense* and the remainder Necator. Whipworm and Ascaris infections are common, but they are less so in the north and are rare in the centre. Strongyloides and (?) Gnathostoma also occur. Trematodes are absent. *H. nana* is found in 1 to 3 per cent., while *Taenia* spp. is common in the Shan States but nowhere else.

*Part VII. Bihar and Orissa.* Hookworm is widespread throughout this area, but the degree of infection is light. Accordingly the Infection Index never exceeds 225 in South Bihar and North Orissa and in general varies from 100 to 150 ; it is low in the strip next the sea. Latrines are rare and soil pollution general all round the villages. Climatic conditions are favourable for under five months of the year and this helps to keep the degree of infection low. Ascaris and whipworms are fairly common. Strongyloides, (?) Gnathostoma, *H. nana* and *H. diminuta* are also found, while two cases of Fasciolopsis infestation were seen.

*Part VIII. Agra and Oudh.* Hookworm is prevalent throughout this area except in the south, where it is negligible. In the north-west, where the rainfall is low and the rainy season short, the infection index is about 100. Elsewhere, it gradually increases from 120 in the south-west to 250 in the north-east, where the rainfall is heavy, the atmosphere humid, soil favourable, and the drainage slight. Soil pollution is general except in certain regions at Terai. Shoes are worn in the south and south-west, contributing to the low infection index—elsewhere, they are only worn on special occasions. The rainfall is less than in some areas of Burma, but the infection is higher owing to it being more concentrated. Owing to carefully constructed wells, Ascaris is rare except in Gorakhpur district. Whipworm is nowhere common. Trichocephalus was found on three occasions, while *H. nana* is found in over 4 per cent. of the population. Taenia occasionally occurs in the lower castes.

T. W. M. C.

RICKARD (E. R.) & KERR (J. Austin). **The Incidence and Intensity of Hookworm Infestation in the Various Soil Provinces of Tennessee.**—*Jl. Preventive Med.* 1926. Nov. Vol. 1. No. 2. pp. 185–203. With 7 charts in text. [11 refs.]

An examination of white rural school children in Tennessee shows that only on the Cumberland Plateau and the Unaka mountains is the hookworm problem severe and of major importance, although it is not so severe as in the Mississippi gulf States.

The climate and general sanitation is everywhere favourable but the soil is mostly unfavourable, cultures showing that sandy soil is favourable for the growth of the larvae but clay and silt are not. Ascaris and whipworms are common in the same regions as hookworms. On the other hand Enterobius and *H. nana* are found in up to 5 and 10 per cent. respectively of the population but bear no relationship in their distribution to hookworm.

T. W. M. C.

BLAJIN (A. N.). Die kopfallgemeine Untersuchung der Schüler in der Schule Namens " Nestor Lakoba " in Sukhum auf die Würmertraegerei. [**Examination of Scholars of Sukhum for Worm Carriers.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 1. German summary p. 70. [In Russian pp. 18–23.]

The author examined the faeces of 145 pupils of a native (Abkhazian) school at Sukhum (W. Caucasus). The samples were examined in smears and by Fülleborn's method. Ankylostome eggs were found in 70–75 per cent. of cases. These are referred to as " carriers," since they showed no clinical symptoms. The amount of haemoglobin was diminished, varying from a minimum of 69 to a maximum of 97 per cent. The number of red corpuscles was more or less normal. There was slight leucopenia, lymphocytosis and eosinophilia (on an average 8·4; maximum 17). In most cases positive polychromasia was noted. Treatment was carried out with thymol (4–5 gm. administered per 0·5 every half hour) and oil of chenopodium (3 doses of 16 drops at intervals of two hours). The examination of the faeces after treatment showed that *N. americanus* was predominant, *A. duodenale* having been found on one occasion only.

C. A. Hoare.

SVENSSON (Ruth M.) & KESSEL (John F.). **Morphological Differences between Necator and Ancylostoma Larvae.**—*Jl. Parasit.* 1926. Dec. Vol. 13. No. 2. pp. 146–153. With 1 text fig. & 8 figs. on 1 plate. [8 refs.]

Svensson and Kessel have examined infective larvae of *Ancylostoma duodenale*, *A. caninum*, and *Necator americanus*, stained with haematoxylin and conclude that generic differences exist; viz. in Necator there is an intermediate space between the oesophagus and intestine which is absent in Ancylostoma, and although a " protrusile oral spear " is present in both it is large and stronger in Necator.

[Of this " spear " it is stated that it is easily seen protruded just before death in chloroform water. That it is a " spear " and not merely a buccal tube extruded in the death agony of the parasite has not been proved.]

T. W. M. C.

FÜLLEBORN (F.). Ueber das Verhalten der Hakenwurmlarven bei der Infektion per os. [**Behaviour of Hookworm Larvae in Infection per os.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Oct. 1. Vol. 30. No. 10. pp. 638–653. [14 refs.]

YOKOGAWA and OISO have stated (this *Bulletin*, Vol. 23, p. 776) that the larvae of *A. caninum* when *fed* to a dog mature without migrating through the lungs, and that this is the normal condition when larvae are fed to the normal host. Fülleborn states that he is able to confirm this only for *Uncinaria stenocephala* of the dog. He performed tracheotomy, as did the Japanese authors, and in addition isolated a loop of intestine. He found that although the forms in the intestine died before reaching maturity, they developed to a greater extent than did those in the trachea. Lung transmission, even in cutaneous infections, is apparently not an essential part of development and is merely a means for the larvae to reach the intestine.

Fülleborn finds also that infections with Uncinaria disappear in about five months and his experiments suggest they produce an immunity to future infections.

T. W. M. C.

SÉNO (R.). Ervaringen over Tetrachloorkoolstof als wormafdrijvend middel bij Anchylostomiasis op Billiton. [**Experiences with Carbon Tetrachloride as a Vermifuge in Hookworm Disease in Billiton.**]—*Geneesk. Tijdschr. v. Nederl. Indië.* 1926. Vol. 66. No. 6. pp. 721–736. With 5 charts in text. [17 refs.]

Though hookworm disease is not of such paramount importance in the Chinese labour force of the tin mines of Billiton as it is, say, on many estates on Sumatra's east coast, the author made a point of treating all the carriers who passed through his hospital in order to keep the degree of infestation as low as possible. His results with carbon tetrachloride confirm the many favourable reports on this drug. The number of worms expelled by a single cure was 89·9–91·8 per cent. of the total number present; the percentage of "absolute cures" by a single treatment amounted to 76·5 per cent. Some facts seem to point to a higher power of resistance of the worms in cases of longer standing. A dosage higher than 3 cc. for adults is not advised, as being useless and dangerous (acute nephritis, and other by-effects). Preliminary fasting and purgation after the cure are recommended. The drug was administered in capsules, which precaution in the author's opinion diminishes the danger of intoxication by way of the respiratory tract. [Unforeseen toxicity of the drug, as already observed in several instances, which constitutes a serious drawback against its application in mass cures, is not taken into the account by the author in his favourable judgment.]

W. J. Bais.

TUYTER (A.). **On Combined Application of Oleum Chenopodii and Carbon Tetrachlorid in Cases of Anchylostomiasis.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 373–376. [2 refs.]

The combined drugs removed 96 per cent. of the hookworms and 55 per cent. of the ascarids present in 36 patients. From ·5 to 1 cc. of Chenopodium and 1 to 2 cc. of carbon tetrachloride was given, according to the age of the patients, which was in the late teens.

R. T. L.

KEHRER (J. K. W.) & OUDENDAL (A. J. F.). Vergiftiging met tetrachloorkoolstof. [**Poisoning with Carbon Tetrachloride.**]—*Nederl. Tijdschr. v. Geneesk.* 1926. Aug. 14. 70th Year. 2nd Half. No. 7. pp. 746–757. With 4 figs. on 1 plate. [18 refs.]

In the authors' first series of 9,000 cases of hookworm treatment with carbon tetrachloride no fatalities occurred, but in a second series of 6,000 they had five deaths. These patients, who had received 5 cc. of carbon tetrachloride and 1·5 cc. of oil of chenopodium, showed fatty degeneration of the liver with a central lobular necrosis and congestion of the portal system, together with a fatty and albuminoid degeneration of the kidneys with desquamation of the epithelial cells. This selective action of the drug cannot yet be explained.

T. W. M. C.

MACIEL (Heraldo). Guerra á Ancylostomose. **[Hookworm Campaign.]** —*Sciencia Med.* 1925. Oct. 30. Vol. 3. No. 10. pp. 593–596.
——. A lucta contra a opilação.—*Ibid.* 1926. May 31. Vol. 4. No. 5. pp. 252–254.

Maciel considers that in Necatorina (gelatin capsules of pure carbon tetrachloride) we have an ideal drug to combat hookworm disease (Opilação), easy to administer, with a fixed dose, economical, moderate in price, without evaporation and non-toxic. He discusses the necessity for intensive campaigns to eradicate a disease which has very serious consequence in Brazil.

T. W. M. C.

LANE (Clayton). **The Mass Diagnosis of Ankylostome Infestation. Part XV. Criticisms: Scientific, Legalistic and Pontifical.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 455–477. [8 refs.]

The object of the author's researches on the mass diagnosis of ankylostome infestation has been to compare, by rigorous ovum counting, the methods employed. The result has given a very accurate and in many ways a most suitable procedure, devised by the author himself, called Direct Centrifugal Flotation. Lane's technique has been accepted by CHANDLER and others as the quickest, easiest and most accurate method of diagnosis. Individually exact diagnosis on a mass scale has been the author's unswerving aim over a period of many years, and he now feels that Direct Centrifugal Flotation approaches it. In the present communication the more important of the criticisms made in recent papers by STOLL and HAUSHEER, by SOPER and by HAUSHEER, HERRICK and PEARSE, have been considered, but no scientific basis for these has been discovered. Moreover, the author feels justified in ignoring criticisms which he considers legalistic or of a nature thus [pontifically] defined by DOBELL in 1926 [and possibly suggested if not accepted by earlier scientists] as " any form of authority in matters of science is . . . anathema." His discussion of the various scientific objections is not summarized by the author and cannot be adequately indicated in a review. It may be said, however, that a careful consideration is given to the justification which lead Lane to make some alteration in STOLL's technique in his own comparative investigation. The objections of STOLL and HAUSHEER (1926) to the use of the cylinder as a faeces comminutor are met. Lane considers the cylinder to be the best known faecal disintegrator, and he attributes the failure of D.C.F. in their hands to failure not of the technique but of complete disintegration. In disintegration the value of soakage is stressed but the danger of the use of decinormal caustic soda solution and the fallacy of using an established chitinoid solvent in " crucial " experiments to test the effectiveness of the D.C.F. method is pointed out. The limit of effective concentration and the factors which make for inaccuracy in hanging or flat preparations are dealt with. The result of tests made on Caldwell's technique and that of Stoll, for which accuracy within 10 per cent. of the average of at least two counts made by any suspension has been claimed, shows that these techniques can scarcely be accepted as giving satisfactory results.

R. T. L.

PANTALEONI (Pio). L'anchilostomiasi nella provincia di Forlì [**Ancylostomiasis in the Province of Forli.**]—*Policlinico.* Sez. Prat. 1926. Feb. 22. Vol 33. No. 8. pp. 264–266. [7 refs.]

Pantaleoni records five cases of hookworm disease in Forlì and draws attention to the clinical and social importance of this parasite.

MAKHVILADZÉ (N.) & DIDEBOULIDZÉ (G.). L'endémie d'ankylostomiase en Géorgie. [**Ancylostomiasis in Georgia.**]—*Bull. Soc. Path. Exot.* 1926. Dec 8. Vol. 19. No. 10. pp. 891–896. [5 refs ]

Hookworm disease is not uncommon in west Georgia, both *A. duodenale* and *N. americanus* being found. No cases have so far been reported from east Georgia, probably owing to climatic conditions being unfavourable.

LINDTROP (H.). Weitere Untersuchungen ueber die endemischen Brutstatten der Ankylostomiasis in Transkaukasien. [**Endemic Foci of Ancylostomiasis in Transcaucasia.**]—*Russian Jl. Trop. Med.* 1926. No. 4. German summary p. 77. [In Russian.]

The present work continues the author's research on Hookworm in Transcaucasia. Both Ancylostoma and Necator occur in this area.

RICO (J. Toscano). L'ankylostomiase autochtone au Portugal. [**Autochtonous Ankylostomiasis in Portugal.**]—*C.R. Soc. Biol.* 1926. Nov. 26. Vol. 95. No. 34. p. 1287.

——. Ankylostomiase autochtone au Portugal : *Ankylostoma duodenale* et *Necator americanus.*—*Ibid.* Dec. 31. Vol. 95. No. 38. pp. 1593–1595. [5 refs.]

——. L'ankylostomiase dans quelques mines portugaises.—*Ibid.* pp. 1595–1596.

Previous cases of hookworm in Portugal have been contracted abroad, but Rico has found that *A. duodenale* occurs naturally among miners in the north of the country.

Necator was found in one miner who had apparently brought it from Brazil. The mines are also infected heavily with ascaris and whipworms.

BALDWIN (A. H.). **Hookworm and Filariasis in Australia.**—*Health.* Melbourne. 1927. Jan. Vol. 5. No. 1. pp. 5–11.

This is a brief survey of the past and present work in progress in combating these two diseases in Australia.

JUILLET (A.) & ESPIÉ (A.). Un nouveau foyer d'ankylostomiase dans le Sud Tunisien à Gabès. [**New Focus of Ancylostomiasis in S. Tunis.**] —*Arch. Inst. Pasteur de Tunis.* 1926. Dec. Vol. 15. No. 4. pp. 336–340.

From an examination of recruits at Sfax, the author has discovered an endemic focus of hookworm disease at Gabès. An examination of stools from the civil prison there confirmed this.

T. W. M. C.

MANALANG (C.). **Critical Tests of Hookworm Remedies on Man.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 57–59.

Manalang has examined, post mortem, eight men treated with carbon tetrachloride and five with chenopodium and finds that the former is much superior to the latter.

R. T L

LITTLE (J. P.). **A Case of Optic Neuritis, caused presumably by *Ankylostoma duodenale* Infection.**—*Jl. Roy. Army Med. Corps.* 1927. Jan. Vol. 48. No. 1. pp. 61–63.

By a process of elimination, Little concludes that optic neuritis, observed in a man of 23, was due to *Ancylostoma duodenale.* (The presence of the parasites was diagnosed from the ova.)

R. T. L.

BARNES (M. E.) & RUSSELL (Paul F.). **Final Report on the Survey of Hookworm Infection, General Sanitary Conditions and Organized Health Work in the Straits Settlements.** Publication No. 1. Straits Settlements Rural Sanitation Campaign. Singapore. 1925. Dec. 31. 30 pp. With 4 figs.

This is a fuller account of the researches of BARNES and RUSSELL which have been reported from another source (*ante,* 192).

T. W. M. C.

V. DRIGALSKI (W.) & KOCH (E. W.). Ueber die Bedeutung des Wurmfortsatzes für die Entwicklung der Oxyuren. Untersuchungen an 200 Schulkindern. —*Deut. Med. Woch.* 1925. Feb. 20. Vol. 51. No. 8. pp. 309–311.

KATO (Yoshiji). [On the Action of Cholesterin against Ancylostomal Anemia.]—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1926. May. Vol. 33. No. 3. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. p. 354.]

DE MELLO (Froilano) & ALVARES (Joaquim Mariano). Cercarias parasitas do Indoplanorbis exustus em Gôa.—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. pp. 245–249. [French summary p. 249.]

NOTTEBAUM. Die Behandlung der Oxyuriasis mit Schwefel.—*Deut. Med. Woch.* 1927. Feb. 11. Vol. 53. No. 7. p. 283.

OBA (T.). Clinical Significance of Eosinophilic Leucocytes in Surgical Diseases, especially of Patients with Intestinal Parasites.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. Oct. No. 259. English summary pp. 1–2. [In Japanese.]

PAGET (H.). The Determination of Ascaridole in Chenopodium Oil.—*Analyst.* 1926. Vol. 51. pp. 170–176. [*v. Bull. of Hyg.* 1927. Vol. 2. p. 165.]

PLAUT (Alfred). Bilharzia Infection in an Apparently Normal Appendix.—*Arch. Path. & Lab. Med.* Chicago. 1927. May. Vol. 1. No. 5. pp. 711–719. With 11 text figs. [4 refs.]

RATTRAY (M. J.). Pylorospasm due to Helminths. [Memoranda.]—*Brit. Med. Jl.* 1926. Oct. 30. p. 781.

SAMBON (L. W.). Refutation of Statements made by Professor R. T. Leiper, M.D., D.Sc., F.R.S., concerning African Schistosomes, "American" Gongylonemas, Zoo Vermin and Italian Cancer Houses.—*Jl. Trop. Med. & Hyg.* 1926. Sept. 15. Vol. 29. No. 18. pp. 314–322.

SCHARFF (J. W.). Notes on a Case of Infantile Ascariasis.—*Malayan Med. Jl.* 1926. Sept. Vol. 1. No. 3. p. 3.

TSUNASHIMA (Yoshito). Zur Funktion der Schilddrüse bei Ankylostomiasis.—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1926. Dec. No. 443. German summary p. 1376. [In Japanese pp. 1377–1385. 54 refs.]

UEMURA (Yoshio). Ueber das Bilirubinspiegel im Blutserum bei Ankylostomiasis —*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellsch.* 1926. July. No. 438. German summary p. 808. [In Japanese pp. 803–807. 14 refs.]

YANO (Ataru). [Findings of the Kidneys Infected with *Filaria immitis* and Experimental Studies on the Toxicity of the Adult Worm and the Eggs.] —*Saikingaku Zasshi* (*Jl. of Bact.*). 1926. Mar. No. 361. [Summarized in *Japan Med. World.* 1926. Nov. 15. Vol. 6. No. 11. p. 325.]

# LEPROSY.

LUIS CARRERA (José). El problema de la lepra en la Argentina. Orientaciones para su profilaxia. [**The Problem of Leprosy in the Argentine. Suggestions for Prophylaxis.**]—*Prensa Méd. Argentina.* 1926. Dec. 20. Vol. 13. No. 20. pp. 680–689.

This is an interesting contribution to the subject, based largely on the study of cases in the Muñiz hospital. The majority of the lepers there come from Santa Fé, and next in order are Buenos Aires, Entre Rios, Corrientes and the Federal Capital.

Some 10 per cent. of the cases have contracted the disease outside the country. Inspection is not very thorough and probably many cases go unrecognized. The author points out the importance of morale and environment in the treatment of patients—open air, good food, as much freedom as possible, work, recreation, and the hopeful expectancy of cure are all important.

Cases are quoted to show how urgently legal enactments are needed; thus, a man who has been a leper for 8 years, with nodules and ulcers, at present in hospital, now wishes to live with his family, and there is no law to prevent it. Again, a woman with mixed leprosy goes repeatedly to her home, stays there for a time, and returns pregnant; she has had five abortions in the last three years, and now wishes to leave hospital so that she may have the accouchement in her own home.

Early diagnosis being all-important for successful treatment, and many medical men knowing comparatively little about the disease, it is suggested that more attention should be paid to leprosy during the student days, the disease being regarded, not merely as a form of skin trouble to be seen in the Dermatological Department, but as an important infective condition. Vice versâ, mistakes are not very infrequent, such, for example, as syphilis being diagnosed as leprosy, and such non-leprous patients have been found mixing with lepers in hospital.

As a further need for legislation it is stated that the time between the appearance of symptoms and the patient coming to hospital is never less than four years, usually more. In one instance the diagnosis was made when a man was 15 years old, and he came to hospital at the age of 64.

H. Harold Scott.

BALIÑA (Pedro L.). Sobre la manera de llevar a la práctica la ley nacional anti-leprosa. [**On the Mode of Carrying into Practice the National Leprosy Law.**]—*Prensa Méd. Argentina.* 1926. Dec. 10. Vol. 13. No. 19. pp. 627–632.

This paper was read at a meeting at which the president of the National Health Department was present. It consists of five subsections: (1) A brief review of the incidence of leprosy in the Argentine, showing that 80 per cent. of cases are found among the poorer classes, and 90 per cent. are in the Provinces of Buenos Aires, Santa Fé, Corrientes, Chaco and Formosa. Section (2) deals with the improvement of the provisions of the law. It is suggested that " Provisional " or " Regional Asylums " should be established for colonization by severe and destitute cases in those places where there are the greatest number of lepers, not in the cities themselves, but outside. One should be erected for Entre Rios and others for Santa Fé and Corrientes. The last two would receive patients from Chaco and Formosa. Section (3) deals with the medical personnel and maintains that all who have to do with the prophylaxis and treatment should be specially trained and qualified by at least a year's study of the disease, and should also have an intimate knowledge of dermatology and syphilis. The two final sections consider the establishment of places for consultation and treatment and the naming of such so as to avoid opposition. To accomplish this, the word " leprosy " is not to be used, but such terms as " The Provisional Asylum of Buenos Aires (Law 11359)," or " Dermato-venereal Dispensary," for example, to give advice on and to treat leprosy, syphilis and other venereal diseases, and affections of the skin.

H. Harold Scott.

PUPO (Aguiar). O problema da lepra no Brasil. [**Leprosy in Brazil.**]—*Sciencia Med.* 1926. Dec. 31. Vol. 4 No. 12. pp. 663–692.

Leprosy was probably imported into Brazil with the negros in 1580, or introduced by the Portuguese from Madeira in 1600. It was certainly not indigenous, for PISON in 1637 reported (as did others before and after him) that " leprosy and scabies are unknown " amongst the natives of Brazil.

Statistics published in 1887 showed that in the previous year there were 363 cases in S. Paulo, and with the increase of the population the number of cases has grown, the ratio keeping at 1–1·4 per mille. In Minas Geraes, recent statistics by Professor ALEIXO give 10,000–12,000 as the number of lepers in the whole State, the population being nearly 6,000,000, or about 2 per mille. In the Northern parts it is but little less ; in Pará and Maranhão the incidence is 1·5 per mille, while in Belém, in the State of Pará, amongst a population of 236,420 inhabitants, the index given for 1923 was as high as 5·5 per mille.

It is calculated that there are in all some 27,000 lepers in the country, so that the problem of dealing with them is both a difficult and a pressing one. The only way of doing this without great waste of energy and needless expenditure is Federal control in collaboration with the various States. " Collective isolation " by the establishment of colonies taking 500–1,000 lepers is advised, planned on lines similar to that of Saint Angelo. Lepers should be given as much freedom as is compatible with safety, while prohibiting their travelling from one State to another. The paper is largely statistical and much of the remainder is devoted to citations from reports of what has been done in other countries. Tables are appended giving the returns of census and of lepers for various municipalities in the different States.

H. Harold Scott.

GUERRERO (Luis E.). **Topographical Distribution of Leprosy in the Philippines.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 653–686. With 1 chart. [7 refs.]

The distribution of the disease has been worked out from the number of lepers segregated at Culion from each area of the Philippine Islands, and compared with the climatic and other conditions. The yearly number of lepers collected averaged 9·51 per 100,000 population, and about 8·28 per 1,000 square miles of country; but the distribution was unequal. Historically it is considered that leprosy was carried by the Hindus to the Malay Archipelago, and imported into the Philippines by the primitive Malay settlers or by later immigrants from the same area; and the disease was certainly present before the arrival of the Spaniards. The areas first settled still have the densest population and the largest proportion of lepers, the outstanding correlation being between density of population and high leprosy incidence: and this is in accordance with the generally held view of the communicability of the disease by close contact. On the other hand, no such close relationship to rainfall was found as ROGERS showed in the case of India. [The humidity and rainfall of the Philippines do not vary to nearly the same extent as in different parts of India.] A poor diet, lacking in vitamins, exerts a predisposing influence in favour of the disease; but this again does not modify the relationship to density of population.

L. Rogers.

NAZARETH (S.), GRACIAS (E.) & D'ARAUJO (A.). Lèpre dans l'Inde portugaise. [**Leprosy in Portuguese India.**]—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 928–934.

The statistics showed 100 known lepers, but the true number is estimated at over 200. The importance of allowing uninfective early cases to be treated at dispensaries, as in British India, is recognized, infective cases being segregated on the lines usually recommended. *H. wightiana* preparations are used in the treatment. Two cases were diagnosed by finding lepra bacilli by puncturing glands. Want of funds handicaps the campaign against the disease.

L. R.

CANAAN (T.). Die Lepra Palästina. [**Leprosy in Palestine.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Jan. Vol. 31. No. 1. pp. 20–31. [23 refs.]

Since 1896 261 cases of leprosy from 114 places are known to have occurred in Palestine. In a few instances the incubation is said to have been from 11 to 27 years. Most cases arise in childhood or youth; the nodular cases are far more infective than the nerve ones. The authors found no very definite relation between climate and the distribution of the disease in this small country. The Wassermann reaction was usually positive, but the sedimentation of the blood test was not reliable. He tried eparseno and thymol in treatment with negative results; but obtained very satisfactory results by the use of chaulmoogra oil preparations, using a combination of Aiouni orally and ethyl esters in Muir's E.C.C.O. mixture intramuscularly in doses of from 0·10 to 1 cc. Three cases were cured, and in others many nodules disappeared and others became reduced in size; ulcers of the skin and throat healed; sensation was regained; the general health improved much. The bacilli disappeared from the lesions.

L. R.

YOANNOVITCH (George). La lèpre en Bosnie et Herzégovine. [**Leprosy in Bosnia and Herzegovina.**]—*Bull. Office Internat. d'Hyg. Publique.* 1926. Dec. Vol. 18. No. 12. p. 1404.

In 1898 compulsory notification of lepers was introduced, when 115 cases were known, which increased to 317 by 1904 through the discovery of 203 new cases, making an incidence of 0·186 per mille. Since that time there has been a steady decrease to only 42 in 1924; 25 of these are Musulmans; all are among peasants, and none in the towns.

L. R.

COOK (Cecil). **Leprosy Problems.**—*Med. Jl. Australia.* 1926. Dec. 11. 13th Year. Vol. 2. No. 24. pp. 801–803.

This is an answer to the paper of MOLESWORTH [*ante*, p. 208], in which he advocated doing away with compulsory segregation, on the ground that racial immunity against the disease is a sufficient safeguard to the British community in Australia. Dr. Cook shows that the arguments in favour of this contention are fundamently unsound; for the leprosy rate in parts of Queensland is not less than 1 per mille, and in the Northern Territory six white lepers have been reported in the last few years in a white population of less than one thousand. In New South Wales leprosy is no longer a danger, thanks to the efficiency of segregation measures there, but it continues in Queensland owing to imperfect administration of the measure; so, in view of the success already obtained in parts of Australia, cessation of the effort would be a national calamity. On the contrary, adequately equipped sanatoria, with efficient specialized treatment are required, especially in Queensland; where thorough investigation of the incidence and effective isolation are absolutely necessary.

L. R.

LEGER (Marcel). A lepra e sua contagiosidade. [**Contagion of Leprosy.**] —*Rev. Med.- Cirurg. do Brasil.* 1927. Jan. Vol. 35. No. 1. pp. 2–10.

The author reviews the present ideas as to the transmission of leprosy, dealing with hereditary transmission and contagion, under the subheadings of: (*a*) statistical evidence from records obtained from various countries; (*b*) experimental evidence of transmission or the failure of transmission to laboratory animals; (*c*) epidemiological grounds. He mentions the views which have been put forward to incriminate biting insects and flies, and concludes that infection is almost certainly by direct contact, though the degree of danger is not so great as for tuberculosis, and that prevention is purely a matter of improved hygiene and sequestration.

H. Harold Scott.

TREUHERZ (Walter). Zur Frage der Leprakontagiosität. [**The Question of Leprosy Contagion.**]—*Dermat. Woch.* 1926. Vol. 83. No. 52a (Ergänzungsheft) pp. 1889–1892.

This paper discusses in a general way the contagiousness of leprosy as seen in Brazil, and emphasizes the exaggerated popular ideas on the great infectiousness of the disease, which is not based on facts. The paper contains no new information.

L. R.

HUIZENGA (Lee S.). **Notes on Leprosy.**—*China Med. Jl.* 1927. Feb. Vol. 41. No. 2. pp. 153–156. With 2 figs. on 1 plate.

This is a brief study of leprosy cases at Kwangju, with especial reference to eye symptoms ; those were found to be nearly all superficial in origin, and mostly due to the lepra bacillus, and they are easily recognized. Stress is laid on contracted pupils, and hesitating movement of the eyes ; the other conditions mentioned being well known leprous lesions.

L. R.

ESQUIER. A propos de deux cas de lèpre. [**Two Cases of Leprosy.**]—*Bull. Soc. française Dermat. et Syph.* 1926. Dec. No. 9. pp. 723–727.

A clinical description of two imported cases seen at Toulon. The writer points out the difficulty of finding lepra bacilli in some cases of the disease.

L. R.

SCHREUDER (J. J. C.). Een geval van lepra, met groote waarschijnlijkheid in Nederland verkregen. [**A Case of Leprosy, most probably Acquired in Holland.**]—*Nederl. Tijdschr. v. Geneesk.* 1927. Mar. 12. 71st Year. 1st Half. No. 11. pp. 1321–1322. [3 refs.]

The case concerns an old seaman, who has suffered from manifest leprosy at least since 1913. He had previously visited various Atlantic ports of Western Europe and lived for 6 months in the U.S.A. ; yet there is no known contact with lepers in his history, except that during ten weeks in 1907, a brother, who contracted leprosy in the East, stayed with him. The unhygienic habits of the patient, who with his bare hands anointed his brother's open wounds during this time and afterwards wore his brother's clothes, may well account for the infection.

Three similar cases of infection with leprosy in Holland are briefly cited from the literature.

W. J. Bais.

HOFFMANN (W. H.). Ein mustergültiges Lepraheim in Cuba. [**A Model Leper Home in Cuba.**]—*Ztschr. f. d. gesamte Krankenhausesen.* 1926. Nov. 6. Vol. 22. No. 23. 2 pp. With 4 text figs.

This is a short popular account of the Havana leper institution with 200 inmates, illustrated by pictures of the grounds and wards, but contains no data of value.

L. R.

PIERINI (Luis E.). Manifestaciones iniciales de la lepra. [**Early Signs of Leprosy.**]—*Semana Méd.* 1927. Jan. 20. Vol. 34. No. 3 (1723). pp. 167–172.

In these four pages short notes are given of 78 cases of leprosy, from which the following conclusions may be drawn : (1) Leprosy, does not, as a rule, begin with a single symptom, but with more than one ; (2) the initial lesion has been noticed to be reddish pigmented spots, sometimes anaesthetic, in 28 of the patients ; oedema, especially of the lower limbs, in 17 ; indefinite symptoms such as fever, headache, general depression, in 12 ; pemphigoid ulcerations in 9 ; nodules in 7 ; coryza or epistaxis in 6; pruritus, general or local, in 5; (3) the patient's occupation seems undoubtedly to exercise some influence in this respect; agricultural day-labourers (25 per cent.) showed lesions of the lower limbs; blacksmiths, stokers, mechanics, chauffeurs, comprising 10 per cent. of the cases, showed lesions of the hands and trunk.

H. Harold Scott.

RODRIGUEZ (José). **Results of the Treatment Work at Culion Leper Colony, Philippines.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo.* 1925. Vol. 2. pp. 699–722. With 2 charts in text. [7 refs.]

This important paper is so belated that it has lost much of its interest, through the publication of later reports from the same leper colony. It deals with the treatment of no less than 2,920 cases, nearly all advanced; and records that 9·1 per cent. had become negative bacteriologically, 22·1 per cent. were markedly improved, 24·8 per cent. moderately improved, 21·8 per cent. slightly improved, 11·2 per cent. stationary, and 10·9 per cent. worse; but these figures do not include the negative cases who had already been paroled or discharged recovered to their homes; and since March, 1922, 531 cases had been declared negative, remarkable results for such an advanced series. Ethyl esters of *Hydnocarpus wightiana* oil gave at least as good results as those from true chaulmoogra oil; and of other oils tried unsaturated ones gave the best results, especially cod-liver oil, but after some three months the cases on it became stationary. A gradual improvement in the results was found in proportion to the amount of the injections; the percentage of improvement increasing progressively from 64·3 per cent. after only 200 cc., up to 93·9 per cent. after 800 to 1,000 cc. had been administered. Further, a tabulation of the results by six-month periods showed a steady rise in the improvement percentage with each additional six months treatment up to 30 months; and the nerve types showed most improvement. The data regarding the duration of the disease in relation to treatment showed improvement in 87·8 per cent. with a duration of only five years, only 68·9 in those of 5–10 years duration, 70·6 in the next five years, and the rate then rose to 79·7 per cent. in the 15–20 year group and to 88·8 per cent. in the small 20–25 year series. The author agrees with MUIR that the importance of proper diet and sufficient exercise cannot be exaggerated in the treatment of leprosy, and general tonics are of value. Diathermy relieved painful neuralgias. Lepra fever was met with in 23·6 per cent. of the treated cases, and only 50·5 per cent. improved during that period, and 18·9 per cent. became worse, against 50·2 per cent. improved and 10·1 per cent. worse in those with no febrile reaction. The mortality was 9·9 to 8·5 per cent. yearly, and there was no doubt the treatment prolongs the life of lepers. Calcium chloride in a 2 per cent. solution intravenously, in doses of 20–30 cc. daily for a week, was found of value in the fever, as advised by MITSUDA, and 2 to 3 grams of bicarbonate of soda orally four or five times a day, or 20 to 25 cc. of a saturated solution intravenously daily for several days were used for the same purpose. Taking into consideration the unfavourable type of cases and other handicaps, and the facts that 481 negative cases have been obtained, while 78 per cent. of those treated throughout the test show improvement, the writer concludes that "it is felt that the results so far are gratifying."

L. R.

NICOLAS (Catalino) & DELGADO (Luis B.). **The Alkaline Treatment of "Lepra Reaction."**—*Jl. Philippine Islands Med. Assoc.* 1926. Nov. Vol. 6. No. 11. pp. 373–380. [7 refs.]

This paper deals further with the alkaline treatment of the lepra reaction fever mentioned in RODRIGUEZ's paper above, and it is based on the assumption that hypoalkalinity of the blood is a factor in its causation. The doses mentioned above of sodium bicarbonate are given, sometimes together with antipyrin or phenacetin; and it was noted that increased secretion of urine and lessening of oedema, when present, followed the treatment; and that iritis and iridocyclitis improved to a surprising degree after the intravenous alkaline injections. The improvement following the treatment strengthens the authors' belief in the presence of acidosis in these cases, although he had not proved it to occur.

L. R.

SHIGA (K.). **Result of Treatment of Leprosy in Chosen, and View on the Isolation Problem of Lepers.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 691–695.

The work reported in this paper was carried out in the hospital on the Korea Peninsula, with injections of chaulmoogra ethyl esters during four years in about 300 cases; of these 39 have been discharged apparently cured and bacteriologically negative, and a number have shown remarkable improvement. In the majority of the nodular cases softening and atrophy of the tubercles was obtained, and also remarkable relief of the pains and anaesthesia. The lepra bacilli became granular, decreased in numbers and finally disappeared. Although the treatment is not yet ideal, it has already greatly simplified the segregation problem, for the patients are now anxious to remain for treatment, and the discharge of patients no longer infective has encouraged voluntary admissions for treatment. This will lead to more effective eradication of leprosy than life-long isolation.

L. R.

NÄGELSBACH (E.). Ambulante Leprabehandlung. [**Dispensary Treatment of Leprosy.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Oct. 1. Vol. 30. No. 10. pp. 656–659. [4 refs.]

Experience in the treatment of lepers as out-patients in Abyssinia is recorded, and the difficulty in getting them to attend sufficiently regularly and long enough for good results is pointed out. Antileprol was used, and after some months treatment a pause of one or two months was found to be advantageous, from 25 to 40 injections being given in a year. One-third of the cases were nodular and two-thirds nerve forms, and the duration 4 to 10 years. The number of lepra bacilli diminished in the nasal secretion, and clinical improvement resulted from the treatment, which has now been carried on for eighteen months but no cures as yet. Only the chaulmoogra oil preparations have produced any benefit.

L. R.

LUIS CARRERA (José). Dos años de experiencia en el tratamiento de la lepra. [**Two Years' Experience in the Treatment of Leprosy.**]—*Prensa Méd. Argentina.* 1927. Jan. 30. Feb. 10 & Mar. 10. Vol. 13. Nos. 24, 25 & 28. pp. 802–809; 839–848; 954–962.

The author has tried various methods of treating his cases of leprosy, though in small numbers, and here records the results.

Two patients were treated by intramuscular injections of cod-liver oil. The first, a woman of 20 years, was given 33 injections, each of 20 cc., in the course of a year. At the end of two months the ulcers healed, leaving areas which were for a long time anaesthetic. No other treatment was employed and the improvement was marked. The second, a woman of 33 years, a more advanced case, had in all 35 injections, but without any resulting amelioration.

To a third patient, a girl of 18 years, with nodular leprosy, were given injections of Heiser's remedy (resorcin, oils of camphor and chaulmoogra), 26 injections in 11 months, but without improvement. The next was treated by Hasson's vaccine, after 35 injections of Heiser's resorcin-chaulmoogra. This was a case of mixed leprosy and the facial nodules disappeared, leaving the skin apparently normal; the anaesthesia also cleared up; the improvement is stated to have taken place " in a very short period." Another patient, a woman of 24 years, who had the disease—the " maculo-anaesthetic form with a few tubercles "—for six years, was given 20 injections of 0·75 cc. of the vaccine intramuscularly and 20 of 0·25 cc. intravenously during three months, and the improvement again was " rapid and surprising." This method is worthy of further trial.

The sixth patient was a case of severe mixed leprosy and was treated by 57 injections of Antilebrina Valenti Rivolta. The facial nodules disappeared, leaving merely a dark staining; the anaesthesia of the face and limbs also cleared up. This case was, unfortunately, not followed up.

Ten patients of the nodular and mixed types were treated by the ethyl esters of chaulmoogra injected intramuscularly. The results may be summed up by saying that in all cases improvement was marked and in one instance a cure has apparently resulted, there being no residual indications either clinically or bacterially.

In the third part are related nine cases treated with the ethyl esters injected intravenously after a short course of intramuscular injections, with excellent results. In two of these the condition seems to have cleared up entirely, and there has been no recurrence, though one has been under observation for several months since ceasing treatment. Injections were administered every four days for a year; at first 9 were given intramuscularly, totalling 160 cc., the final doses being 20 cc. each. The patient then received 58 intravenous injections, the highest being 12 cc. and the total 364 cc. These doses were well tolerated.

Finally, five patients were given the ethyl esters, intramuscularly and intravenously at the same time, with very good effect, but not better than those already recorded with the single route.

H. Harold Scott.

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JOUENNE (P.) & GUILLET (R.). Deux cas d'améliorations de lèpre après traitement par le B.C.G. [**Two Cases of Leprosy in which Improvement followed B.C.G. Treatment.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 91–92. [1 ref.]

The authors report two cases of improvement after the injection of B.C.G. in doses of 0·02 gm. of the bacillus of Calmette & Guerin, producing abscesses with little pain, from which the bacillus was recovered. In the first case the appearance of the patient improved, the macules cleared and some sensation was regained ; and the second case showed very similar improvement. All the injections were followed by abscesses.

L. R.

AOKI (T.). **Early Diagnosis and Modern Treatment of Leprosy.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1927. Jan. No. 262. English summary p. 4. [In Japanese.]

In the early diagnosis the author thinks the iodine reaction is of great value, since leprosy patients are very sensitive to the drug. He relies in treatment mainly on *H. wightiana* oil, cod-liver oil and thymol injected subcutaneously in the diseased parts every few days.

L. R.

SCANLON (R. W.). **Leprosy Cases treated in 1925 in Somaliland.**—*Somaliland Protectorate Ann. Med. & San. Rep. for the Year ending 31st December, 1925.* pp. 33–35.

Six cases of leprosy treated by E.C.C.O. mixture of Muir containing ethyl esters of *H. wightiana* with improvement are reported.

L. R.

IMPEY (S. P.). **Leprosy: its Transmission and Treatment** [Correspondence.]—*Brit. Med. Jl.* 1927. Feb. 26. p. 401.

This letter supports the view that chaulmoogra oil preparations are not of much use in the treatment of leprosy, and is apparently based on trials of its oral administration in South Africa thirty years ago, when it was found of use only in very early cases. The writer suggests linear incision of thickened nerves. [This plan has already been used with some success by E. MUIR in Calcutta.]

L. R.

DE MELLO (F.) & CABRAL (J.). Résultats d'injections d'éparséno sur deux malades de lèpre mixte. [**Result of Injections of Eparseno in Two Cases of Mixed Leprosy.**]—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 779-780.

The treatment resulted in the death of one patient, and the aggravation of the symptoms in the other ; so the authors reject it as a remedy for leprosy.

L. R.

MCILHENNY (Paul A.). **Orthopedic Problems in Leprosy.**—*Jl. Amer. Med. Assoc.* 1926. Dec. 4. Vol. 87. No. 23. pp. 1888–1891. With 5 text figs.

This interesting work was carried out in the National Leprosarium at Carville, Louisiana, at the suggestion of O. E. DENNEY, to improve the utility of the deformed or weakened hands of nerve forms of leprosy. The author noted reduction of the surface temperature of the anaesthetic parts, as compared with adjoining areas. The treatment adopted included whirlpool baths, massage, active and passive exercises on pendulum machines of the Zander type, faradic and galvanic current, radiant or deep therapy light, ultraviolet rays, and in a few cases diathermy for the relief of nerve pains. Marked improvement has been noted in some, and considerable in many who took the treatment regularly; several patients have been completely relieved of their deformities and discharged from the department. Artificial limbs have been supplied to a number of patients, who had lost limbs by amputation. [This line of treatment appears worthy of further attention by leprologists.]

L. R.

MARTINS (Thales). L'action physiologique des éthers éthyliques des acides gras de l'huile du *Carpotroche brasiliensis*. [**Physiological Action of Ethyl Esters of the Fatty Acids of** *C. brasiliensis* **Oil**]—*C.R. Soc. Biol.* 1927. Feb. 25. Vol. 96. No. 7. pp. 474–475. [1 ref.]

This paper deals with the action of the ethyl esters of the Brazil chaulmoogric acid containing oil on the heart and the muscles of frogs, with the production of slowing and diminished tone of the heart and of the muscles: the action being similar to that of preparations of chaulmoogra oil.

L. R.

FRANCHINI (G.) & CENDALI (G.). Riproduzione sperimentale della lepra nella scimmia e nel ratto bianco. [**Experimental Leprosy in the Monkey and the White Rat.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Jan. Vol. 8. No. 1. pp. 3–6. With 2 coloured plates. [1 ref.]

The authors inoculated the juice from a human leproma rich in bacilli into the peritoneum of guineapigs, white rats and white mice. A month later an emulsion of a nodule from another patient was injected into the same animals and also in the right superciliary region and the left thigh of a monkey (*Macacus sinicus*). Two of the mice died in a week and a guineapig in a month; post-mortem findings were negative. In the monkey, a few days later, a swelling appeared over the right eye, hard, bluish-red in colour, increasing in a fortnight to the size of a grain of maize; this now decreased and had disappeared 45 days after inoculation. In another 45 days there was noticed a diffuse reddening of the right upper lid, at the edge of which was a small, reddish-blue swelling as large as a millet seed; it increased to the size of a chickpea and was fairly firm but moveable on the underlying tissues. A similar nodule developed just above the point of inoculation in the thigh. This was incised, under anaesthesia, and in smears from scrapings from the depths and from the blood-stained fluid abundant acid-fast bacilli were seen, isolated and in groups. Three weeks later the nodule began to diminish; at no time was there any fever or other sign of constitutional disturbance, and at the time of writing, five months after inoculation, the animal appeared to be in perfect health.

The white rats, twice inoculated, revealed no local symptoms, but after 3 months lost weight. One was killed but nothing was found except *Cysticercus fasciolaris* in the liver. In a second, killed two days later, the peritoneum was adherent and showed several nodules, violet in colour, the size of hempseed, and the fluid was of a deep red. Smears from this showed numerous acid-fast bacilli, but those from other organs—liver, lungs, spleen, axillary and inguinal glands—gave negative results.

H. Harold Scott.

CENDALI (Guido). Studio sulla lebbra. [**Studies of Leprosy.**]—*Arch. Ital. Sci. Med. Colon.* 1926. Nov.–Dec. Vol. 7. No. 11–12. pp. 240–266. With 2 coloured plates. [38 refs.]

This article is apparently a reprint of a thesis presented by the author for his diploma. Apart from remarks on leprosy generally, there is an account of inoculations carried out by Reenstierna's method, using emulsified nodules rich in bacilli for injection into monkeys, white rats and white mice (see above).

The author relates four cases of leprosy, one the nodular type, two the maculo-anaesthetic, and one mixed, treated with chaulmoogra in the usual way. It is worthy of note that the serum in each case gave at the beginning of treatment a positive Wassermann reaction.

H. Harold Scott.

ROFFO (A. H.). [**Transmission of Leprosy to the Lower Monkey.**]—*Rev. Méd. Latino-Americana.* Buenos Aires. 1926. Nov. Vol. 12. p. 181. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Mar. 19. Vol. 88. No. 12. p. 967.]

Leprous material was inoculated into 22 American and African monkeys, and three developed granular tissue, histologically and bacteriologically similar to human lepromas. The incubation period was from 80 to 85 days, and after 60 days the lesions usually tended to retrogress ; so the induced infection is purely local and self-limited and never assumes the generalized progressive form of human leprosy.

L. R.

CABRAL (Joaquim). Sobre a possibilidade da transmissão da lepra pelos insectos. [**Transmission of Leprosy by Insects.**]—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. pp. 100–105. [2 refs.] [French summary pp. 105–106.]

DE MELLO (F.) & CABRAL (J.). Les insectes sont-ils susceptibles de transmettre la lèpre?—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 774–777.

After references to published papers, a few experiments by feeding insects on lepromata, and examining them subsequently for acid-fast bacilli, are given; they showed a tendency for the bacilli to decrease in the intestinal canal of bugs and flies, and to disappear after some days. The conclusion is come to that the facts do not indicate any active rôle in the transmission of leprosy by insects. This is in accordance with previous work.

L. R.

ARAUJO (H. C. de Souza). Cultura do bacillo da lepra. [**Cultivation of the Leprosy Bacillus.**]—*Brasil-Medico.* 1927. Mar. 5. Vol. 41. No. 10. pp. 199–200. With 1 text fig.

The author gives an account of HARADA's method of growing lepra bacilli by placing a fragment of leproma on a medium partly solid, partly fluid, the leproma resting on the narrowed portion of a constricted culture-tube and just dipping into the fluid beneath. The liquid medium consists of meat 375 gm., water 1,000 cc., peptone 0·5., NaCl 5·0 ; the other [which is also called " liquid " in the formula, but not in the text] is made up of mannose 95·0, aluminium "a little," iron "a trace," calcium "a moderate quantity." An abundant growth occurred in 4 weeks at 37° C. The bacilli obtained were strongly acid- and alcohol-fast. Injected into laboratory animals multiplication occurred in various organs and produced lesions identical with those resulting from leprous material. 0·05 cc. of the emulsion of a seven-weeks' culture killed rats in 30 days after being injected intraperitoneally, and 0·5 cc killed guineapigs in 120 days. Medical men at the leprosarium at Sotojima have confirmed the cultural findings of HARADA.

H. Harold Scott.

CABRAL (Joaquim). Estado actual da sciencia sobre a bacteriologia da lepra, com investigações pessoais sobre as culturas do bacilo de Hansen. [**Bacteriology of Leprosy. Attempt to cultivate the Bacillus.**]—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. pp. 107–143. [18 refs.] [French summary p. 143.]

The morphology and distribution of lepra bacilli in the tissues was carefully studied, and attempts to cultivate the organism on a large variety of media were made, with completely negative results. Previous reported successes were due to saprophytes only having been obtained, and not the lepra bacillus. Nothing new was discovered.

L. R.

WADE (H. W.). **Preliminary Notes on Serological Findings in Leprosy, with Special Reference to Certain Non-specific Determinations.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 637–649. [3 refs.]

The writer returns to this subject [see this *Bulletin*, Vol. 23, p. 840], and points out the importance of trying to find some reaction of diagnostic value in the absence of any bacterial test, and the impossibility of cultivating the lepra bacillus; for that purpose non-specific blood reactions are worthy of study.

In the present paper he deals chiefly with the simple formalin coagulation test by the addition of a few drops of strong formalin to 1 cc. of blood serum; in addition to which he has used the simple physical method of Naegeli for determining the refractivity of the whole serum, and its relative viscosity, as given by the Hess viscometer for determining the globulin ratio of the total proteids; which he prefers to call the "globulin value." Over 700 estimations have already been made. The normal figure is about 40, and the maximum in healthy subjects about 50; but in leprosy cases it is higher, and increases with the longer duration of the disease, decreasing in cases that are recovering. Tuberculosis also gives high readings, which complicates the problem owing to the frequency of this complication of leprosy. In children born in the colony the globulin value is normal in a larger proportion of the younger than of the older children, which is significant in relation to the more frequent development of leprosy with increasing age; but treatment with chaulmoogra derivates complicates the matter, since the effect of the drugs on the globulin content has not yet been ascertained. During lepra reactions the globulin value is very high, for only 17 per cent. of 63 cases showed figures below 91, and the others ranged between that point and 110. The formalin coagulation reaction corresponds in a general way with the globulin values, and is almost always positive in cases with significant increase in globulin. Over 1,000 formalin tests indicate that a yearly test might enable many cases of incipient disease to be detected before the stage of clinical symptoms or of disability ; being parallel to the more difficult laboratory globulin value estimations. The simpler test therefore may prove of great clinical value.

L. R.

PALDROCK (A.). Zur Muchow-Lewyschen Leprareaktion. [**The Muchow-Lewy Lepra Reaction.**]—*Dermat. Woch.* 1926. Sept. 4. Vol. 83. No. 36. pp. 1295–1299.

Lepra nodules are extracted for eight days with a five-fold amount of 96 per cent. alcohol, heated at 56° C. for half an hour on a water bath and filtered, an opalescent fluid being obtained. The serum of the patient is inactivated at 56° C. for half an hour. In 25 well marked nodular cases about half gave positive and half negative reactions, so the test was quite unreliable. The author is doubtful whether it is of any value whatever in the diagnosis of leprosy.

L. R.

RUBINO (Miguel C.). Réactions sérologiques dans la lèpre. [**Serological Reactions in Leprosy.**]—*C.R. Soc. Biol.* 1927. Jan 28. Vol. 96. No. 3. pp. 225–227.

In this test one cc. of the patient's serum is mixed with 1 cc. of a suspension of sheep's red corpuscles, which have been washed in physiological saline, and to which one-tenth of their volume of formal has been added. After mixing and keeping at 37° C. for one hour, normal sera give an opaque brown, very stable suspension and slow globular sedimentation; but when the reaction is positive a flocculant precipitate appears and become deposited, and the globules form a dark mass at the bottom of the tube. The blood of 25 out of 32 lepers, or 78 per cent., gave a positive reaction, which was rarely seen in 700 controls.

L. R.

CASTRO PAULLIER (V.) & ERRECART (L.). [**Rubino's Leprosy Test.**]—*Rev. Méd. Latino-Americana.* Buenos Aires. 1926. Sept. Vol. 11. p. 2197. [Summarized in *Jl. Amer. Med. Assoc.* 1926. Dec. 11. Vol. 87. No. 24. p. 2039.]

Rubino's test was carried out in 17 lepers and 5 controls ; but the results were unsatisfactory, and proved positive in some nonleprous and negative in some leprous serums.

L. R.

SAKURAI (Hosaku). [**Re-Examination of Serological Reactions and Fermentation Diagnosis of Leprosy.**]—*Hifuka Hitsunyokika Zasshi* (*Jl. Urol. & Dermat.*). 1926. Apr. Vol. 26. No. 4. [Summarized in *Japan Med. World.* 1926. Dec. 15. Vol. 6. No. 12. p. 360.]

Serological tests were carried out by various methods on several hundred lepers. The author concluded that a comparatively high percentage gave positive luetic serum tests ; but the difference was that the syphilitic sera showed parallel reactions with the different tests in almost all cases whereas this was not the case with the leprosy sera.

L. R.

LLOYD (R. B.), MUIR (E.) & MITRA (G. C.). **The Influence of Syphilis on Leprosy as indicated by the Wassermann Reaction.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 667–678. [8 refs.]

The authors report further work to determine if positive Wassermann reactions in lepers yield to antisyphilitic treatment, and they summarize their conclusions as follows :—

" 1. The percentage of positive Wassermann reactions in mild types of leprosy (A1 and B1 types) is 15 per cent., i.e., no higher than the average syphilis rate. In 100 per cent. of instances these reactions are abolished by antisyphilitic treatment. They are therefore all due to co-existing syphilis.

" 2. Where ordinary Wassermann techniques are employed the percentage of positive reactions obtained in the more advanced stages of skin leprosy (B2 and B3 types) is much higher than the above, averaging 50 per cent. or more according to the type of case. At least three-quarters of these positive reactions are due to syphilis, as evidenced by the effect of antisyphilitic treatment. The explanation of the high syphilis factor in the B2 and B3 types we believe lies in the fact that many Wassermann-positive leprosy cases tend to pass rapidly into the graver forms of the disease. Of the positive Wassermann reactions unaffected by antisyphilitic treatment in the advanced cases, some are possibly not caused by syphilis ; as there is evidence in leprosy of a peculiar serum change which may lead to non-specific reactions. Weight must also be given to possible Wassermann-fast cases of syphilis in leprosy.

" 3. Antisyphilitic treatment of lepers is an indispensable adjunct to anti-leprotic treatment. In the application of this, it is important to avoid the use of drugs likely to lead to serious leprotic reactions. We believe we have found in Hg. 33 (Avenyl) a drug eminently suitable for the control of syphilis in leprosy.

" 4. To enable antisyphilitic treatment to be efficiently carried out, facilities for serological tests are essential.

" 5. A well-adjusted flocculation reaction such as that of Kahn is probably the serological test of choice for use in leprosy clinics.

" 6. The clinical effect of antisyphilitic treatment in Wassermann-positive leprosy cases is very remarkable. Some cases clear up on this treatment alone, and others are enormously improved.

" 7. Antileprotic treatment has no specific effect on the positive Wassermann reaction in leprosy.

" 8. The available evidence points to the conclusion that any non-specific reactions in the later stages of leprosy are due to experimental factors, and are not caused by reagins comparable to those responsible for complement fixation in syphilis. They will not therefore serve as a basis for any specific serum test for leprosy."

L. R.

LEMANN (I. I.), LILES (R. T.) & JOHANSEN (F. A.). **Blood Serum Calcium in Leprosy.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 61–70. [12 refs.]

The authors found the serum calcium normal in lepers, and it was unaffected by bone absorption, fever, or the administration of chaulmoogra oil.

L. R.

BARGEHR (P.). Künstliche lepraspezifische Allergie und aktive Immunisierung gegen Lepra. [**Induced Lepra-Specific Allergy and Active Immunization against Leprosy.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Dec. 6. Vol. 49. No. 3-4. pp. 346–353.

Interesting experiments are described of attempts to produce immunity in the human subject by cutaneous inoculations with leprolin, made from leprous nodules by heating the minced nodules with a little water to boiling point in a water bath for 20 minutes, rubbing into a paste and adding 0·5 per cent. carbolic acid. Two small areas of skin are scarified on the upper arm, and the leprolin rubbed into one, the other serving as a control; and if no reaction occurs, after seven days, the process is repeated in the other arm, and further similar inoculations made up to five or more until a reaction occurs, in the form of some local redness and swelling. Of 15 Javanese in contact with lepers 12 gave positive reactions, usually after the second or third inoculation, and only occasionally after the fourth. In a second group of 12 children from a few months to 12 years of age positive reactions were only obtained in three of from 6 to 12 years old, after the second inoculation in two and after the third in one. In a third group of 8 children born in the leper colony of leper parents, and aged from half to ten years, but free from any sign of leprosy, one aged 12 reacted after the first inoculation, and 3 from 2½ to 9 years at the second; but the rest failed to react after even seven inoculations. It therefore appears that reactions are readily produced in healthy adults by two to five cutaneous inoculations of leprolin, but in children only a minority react, and the author thinks that positive reactions indicate that immunity has been produced. He is anxious that in some leprosy infected island with one to two thousand inhabitants, such as in the Moluccas, half the population should be immunized by up to five to seven inoculations of leprolin, until reactions result, including half the adults and half the children, and careful records kept to ascertain if protection is obtained; or he thinks it would be better still if half the population of an healthy island were inoculated and then lepers introduced among them to test the immunity produced, a suggestion that will hardly appeal to British workers.

L. R.

INDIAN MEDICAL RECORD. 1926. Sept. Vol. 46. No. 9. Special Leprosy Number.

TERRA (Fernando). Lepra e cancer.—*Brazil-Medico.* 1926. Oct. 30. Year 40. Vol. 2. No. 18. pp. 245–246.

# SLEEPING SICKNESS.

JAMOT (E.). La maladie du sommeil dans le nord du Cameroun. [**Sleeping Sickness in the North of Cameroon.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. July–Aug.–Sept. Vol. 24. No. 3. pp. 318–349. With 1 map.

In 1923, it was discovered that sleeping sickness existed on the banks of the Logone and Chari in the region of Fort-Lamy [this *Bulletin*, Vol. 20, p. 689]. In the present paper are recorded the observations made during the period Sept. 1924, to June, 1925, with a view to determining the importance and limits of this new focus and of formulating a practical scheme of prophylaxis.

In so far as Cameroons is concerned the focus is entirely limited to the Fort-Foureau subdivision and comprises a long narrow neck of territory between Tchad colony and Nigeria. Tchad lake, the Bas-Chari, the Bas Logone, the El-Beid and its tributary the Kalia, are the natural frontiers in the north, east, and west, and a conventional line separates it in the south from the subdivision of Yagoua. The paper is illustrated by a good map of the district. An account follows of the nature of the soil, the hydrography, the vegetation and the climate. The country is peopled by Kotokos, Arabs, Foulbés, Bornouans and Bananas: the dominant elements are the Kotokos, Arabs and Bananas; between them there is only one thing in common, and that is Islamism. A general description is given of these people and of their habits.

There then follows a detailed account of the incidence of sleeping sickness in the subdivision and statistics are given of the various villages visited. In all, some 29,366 persons were examined in the different portions of the division, and the total number of cases of sleeping sickness discovered was 1,948 (6·6 per cent.); of these 160 (8 per cent.) were very ill, and the number of deaths from the disease was 340 (1·1 per cent.). There is an interesting table in which are set forth the degree of infection amongst persons of different ages of the two sexes. Apparently, young children of below 5 years of age are much less infected than children over 5 years, and adolescents and adults. Amongst the males the morbidity was, up to 5 years, ·097 per cent.; from 6 to 15 years, 14·9 per cent.; from 16 to 25 years, 18·4 per cent.; from 26 to 50 years, 10·4 per cent., and above 50 years, 4·4 per cent. Amongst the females the morbidity for the same ages was ·2 per cent., 6·6 per cent., 4·8 per cent., 4·8 per cent., and 3·7 per cent. respectively.

There is a strict parallelism between the distribution of the disease and that of *Glossina tachinoides*.

Diagnosis was based on the microscope. The trypanosome was first sought by puncture of one of the cervical glands, then in cases where this was negative or there were no puncturable glands the blood was examined by the thick drop method: exceptionally recourse was had to lumbar puncture. In all, 9,256 examinations of gland juice and 11,261 of blood were made.

Of 11,482 suspected cases, 7,944 (27 per cent. of the population visited) had puncturable cervical glands and among these 1,507 (18 per cent.) were found to contain parasites. Subsequent blood examination revealed trypanosomes in 406 cases. Thus, of 1,913 cases diagnosed, in 78 per cent. parasites were discovered in the gland juice and in 21 per cent. in the blood. There figures show that blood examination is a necessary complement to gland puncture, as the latter alone will allow a definite number of cases to escape observation.

The author emphasizes that it is very important to re-examine the suspects, preferably after an interval of 4 or 5 days, and that by this means 91 infections were discovered.

In regard to the state of the glands in the infected cases the author found that out of a series of 935 cases in whom trypanosomes had been found, 36 (3·8 per cent.) had no enlarged glands, 38 (4·0 per cent.) had glands which were not puncturable, 137 (14·6 per cent.) had small puncturable glands, 273 (29·1 per cent.) had glands which were atypical either as to number, form, size, or consistence, and 451 (48·2 per cent.) had glands in all respects typical.

With regard to treatment it was proposed to administer a mixed course of atoxyl and neo-arsenobenzol which has given particularly good results, but, unfortunately, an outbreak of recurrent fever caused the neo-arsenobenzol to be used for the latter purpose, and the sleeping sickness to be treated with atoxyl alone. About forty very advanced cases have been treated in a provisional hospital with tryparsamide with excellent results ; details are given of four of these cases. The article closes with certain remarks on epidemiology and administrative prophylaxis.

W. Yorke.

Carpenter (G. D. Hale). **Report by the Senior Medical Officer in Charge Sleeping Sickness for 1925.**—*Uganda Protectorate Ann. Med. Rep. for the Year ended 31st December, 1925.* pp. 84–91.

In this report the author describes the position of sleeping sickness in the various infected areas.

(a) *The Victoria-Nyanza and The Victoria Nile-Jinja-Kakindu Area.*—No case of sleeping sickness has been found except in the neighbourhood of Mjanji, where the disease is endemic. Dr. Griffin reports that several cases seen in 1922 at Mjanji are alive and that the majority of the survivors are among those who received 2 or 3 injections of salvarsan substitute.

(b) *The Mpologoma Area and the Busitema Area.*—These were not visited and little is known of the extent of the infection.

(c) *The Siroko Valley Area.*—This was not visited and so far as is known the *G. palpalis* here is still uninfected.

(d) *The Katwe Area.*—This area was not visited by the author, but the District Medical Officer found no cases in the villages at Katwe and along the main road. One case was reported by natives at Kasenyi and seven others from Busongora. No cases were reported from Ankole or Kigezi.

(e) *The Bwamba Area.*—The District Medical Officer writes that every one of the recently reported cases was known to have been removed from a fly area some three or four years ago, and it is evident that the tertiary symptoms are only just developing. About a dozen cases appeared to have occurred in two villages outside the recognized sleeping sickness area.

(f) *The Wasa River Area.*—The District Medical Officer reports that a boy was found to have sleeping sickness in Fort Portal, and that he had apparently come from the infected neighbourhood of the Wasa River Area.

(g) *The Buganda Lake Albert Area.*—This small uninhabited area was not visited.

(h) *The Bunyoro Area.*—In May the District Medical Officer reported a case of sleeping sickness from south of Hoima near the Kafu River, but he was probably infected in the Waki River Area. The Upper Waki basin was toured to ascertain whether inhabitants might similarly have become infected through visiting the Waki River. Over 2,000 persons were examined, but no case of infection found. The Medical Officer reports that the number of tax-payers in the re-occupied strip of the Bugungu coast is now 244, a considerable increase over last year. No fresh cases of sleeping sickness have been found nor have any been reported from re-occupied areas of Kyso and Tonia.

(l) *The Lango Area.*—This very small district calls for no comment.

(m) *The Nile Area.*—The author toured the parts in the West Nile District during August and September. He found the conditions more satisfactory than in 1922, and protective clearings were on the whole good, but it was probable that cases of sleeping sickness were being concealed. Over 7,000 men, women, and children were examined and six suspects subsequently investigated microscopically. Five were found to be infected.

A case of sleeping sickness was reported from Madi in October, and it is possible, therefore, that the northern main road from West Madi to Arua is infected.

Turning to the part in the Gulu District, it was found that the total number of deaths from sleeping sickness in the Acholi area for 1925 was 73 and in the Madi area 136.

The part in the Chua District was toured by the author in November. Only three cases of sleeping sickness have been found among about 12,000 people examined.

The following are the concluding remarks :—

" A great amount of work, mainly administrative, which requires detailed medical recommendations, still remains to be done on Lake Victoria, and in the Eastern Province especially. It has not yet been possible fully to supply all details required.

" For the Northern and Western Provinces detailed medical recommendations were supplied before the middle of 1925, as a basis on which the revised ' Instructions ' which are needed could be drawn up, but these have not yet been promulgated. A centre for treatment has been established near Mjanji. In the Western Province more work requires to be done in the Bwamba and Katwe areas, and in the Northern Province the West Nile District requires more attention than can be given by the Senior Medical Officer posted to Arua.

" There has been a very decided improvement in the Acholi area of Gulu District, but in certain parts of the Madi area there has been an equally decided increase in the amount of infection which can only be dealt with by therapeutic measures. Prophylactic clearing can effect nothing further, for with very few exceptions all places on streams frequented lawfully by people leading normal lives are adequately cleared. Nothing can be done to protect by clearings, hunters or people who trespass into closed areas.

" Treatment centres have been established in East and West Madi, but it remains to be seen whether a single Medical Officer can cope with treatment and frequent inspection of all the population in Madi on both sides of the river. The situation in the Acholi area of Gulu District and in Chua can probably be controlled by the District Medical Officers."

W. Y.

MACLEAN (George). **History of an Outbreak of Rhodesian Sleeping Sickness in the Ufipa District of Tanganyika Territory with Short Notes on Cases and Treatment.**—*Ann. Trop. Med. & Parasit.* 1926. Dec. 17. Vol. 20. No. 4. pp. 329–339. With 1 map.

This outbreak occurred in a portion of a large open forest which is said to extend, with few breaks, over an area of 50,000 square miles. Two rivers—the Rungwa and Ugalla—traverse the area; during the rains they are several hundred yards wide, but in the dry season they are reduced to stagnant pools and form practically the only natural water supply of the area. The population lives in small scattered clearings which are frequently only a few acres in extent. A village may consist of anything from one to forty houses, usually of five to ten.

*G. morsitans* was the only tsetse found: except at certain centres it is scanty from the middle of the dry season (August–September) to the beginning of the rains (November–December), but towards the end of the rains to the beginning of the dry season it is practically co-extensive with the forest. Other biting flies met with are Tabanus, Haematopota and, in some places, Chrysops. Game is fairly abundant, those most frequently seen near human habitation being roan, bush-buck, oribi and allied species, bush-pig, wart-hog, and baboons.

Whether the disease has been endemic for an indefinite period or whether it is of recent introduction it is impossible to say. The natives regard it as a new disease which started at Tumbu, but they usually confuse other diseases, especially ankylostomiasis, with sleeping sickness and the question must remain open. The recent history is fairly clear. It is known that deaths occurred from a disease, characterized by swelling of the legs, as early as 1915, in the vicinity of the Mtate river, but what this was is uncertain. In 1920–21 a fatal disease, characterized by emaciation, swelling of the legs and death, established itself at Tumbu in which there were originally sixteen families; within a year all these had either died or escaped to neighbouring villages. Kitundu and later Simbo were similarly attacked.

The author traces in great detail the spread of the epidemic from these centres, because he believes the history to show the importance of the human agent in spreading the disease when the incidence is high. Cases have occurred which could not be traced to a human infected focus, but Maclean thinks it not improbable that a more precise knowledge of their movements would elicit a connexion with a human source. The argument is supported by a diagram illustrating the incidence of the infection in various parts of the area. The estimated population of the whole area—the Baula Sultanate—comprising about 500 square miles, was, in November, 1924, about 563, and of these 62 were found to be infected between November, 1924 and December, 1925.

The causes of the outbreak are unknown, but certain disturbing factors may be important, especially the late War and influenza. The former led to considerable disorganization and movements of the population.

Remarks on diagnosis, symptomatology and treatment follow. Of 27 cases treated with "Bayer 205" between November, 1924, and

March, 1925, 14 were still alive in March, 1926, and 8 had remained in good health without further treatment since December, 1924. One of these 8 had been ill for two months and the other seven for only a month or less before treatment. All the relapse cases, except possibly one, were more advanced and had had symptoms for two or more months before treatment. Two of these relapse cases are now in good health after tryparsamide.

Tryparsamide was tried in a few cases, but the results do not seem to be very encouraging. Maclean, however, thinks that it is not yet possible to make a fair comparison between the two drugs: he is now trying the effect of combined therapy.

W. Y.

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BEVAN (Ll. E. W.). **The Influence of Dipping in Solutions of Arsenic upon the Course of Trypanosomiasis.**—*Jl. Comp. Path. & Therap.* 1926. Dec. Vol. 39. Pt. 4. pp. 284–289. Also in *Rhodesia Agric. Jl.* 1927. Feb. Vol. 24. No. 2. pp. 163–190.

Reference is made to the work of LOUNSBURY, THEILER, and WATKINS-PITCHFORD, who devised a dipping solution containing arsenic in which cattle could be dipped at short intervals without harm. It was found, as a result of frequent immersion, that the tissues of the animal developed tolerance to the arsenic. The total eradication of ticks from an area can be accomplished by this short-interval dipping, and experiments have shown that ticks sown on a regularly dipped animal three days after the last dipping failed to develop, whereas others sown under similar conditions upon undipped animals came to maturity.

It has been frequently suggested that this process might be of use in the control of trypanosomiasis, and it was hoped that the arsenic absorbed as the result of frequent and regular immersion might act in one of the following ways:—

1. By poisoning the tsetse fly taking up blood from the skin in which the arsenic had become deposited.
2. By destroying the trypanosomes in the flies imbibing such blood.
3. By rendering the fly infertile.
4. By protecting the animal into which infective material was injected by the fly in the act of biting.

It is, however, a well-known fact that fly-struck cattle suffering from chronic trypanosomiasis will, when exposed to heavy rains, develop an acute attack of the disease. It was therefore feared that dipping might have a similar effect. In order to clear the point, experiments were conducted with guineapigs infected with two strains of trypanosomes, one, *T. rhodesiense*, obtained from an infected native, and the other, *T. brucei*, obtained from a naturally infected donkey.

Details of eight experiments are given. They indicate that dipping of guineapigs infected with trypanosomiasis in arsenic containing solutions of certain strength and at certain intervals causes disappearance of trypanosomes from the peripheral blood. The parasite, however, is not eliminated, but reappears after a shorter or longer interval when dipping is discontinued.

The result appears to depend on two factors:—

1. The strength of arsenic in the solution.
2. The frequency of the immersion.

Solutions containing 1 in 300 of Cooper's cattle dip did not cause disappearance of the parasites from the blood when the animals were immersed at intervals of three days, nor did they exert any protective effect against syringe infection. With solutions of 1 in 156 of the cattle dip, the parasites disappeared after three, four, or six dippings, and such solutions, although they did not entirely protect the animals, arrested the development of the parasite when injected with the syringe.

The experiments show that the effect of dipping upon the parasite is due to the absorption of arsenic and its gradual accumulation. They also indicate that immersion in cold water of guineapigs infected with trypanosomiasis hastens the course of the disease, corresponding with the practical observation that fly-struck cattle when exposed to heavy rains rapidly succumb.

W. Y.

BOYÉ (L.). La prophylaxie de la trypanosomiase en Afrique équatoriale. Résultats de la méthode des six injections consécutives d'atoxyl. **[Prophylaxis of Sleeping Sickness. Six Consecutive Injections of Atoxyl.]**—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 55–56.

As a result of their work during 1922 to 1924 at Brazzaville, BLANCHARD and LAIGRET found that the customary prophylactic course—two injections of atoxyl at a week's interval—gave a minimum blood relapse of 25 per cent., whilst a course recommended by them—six injections at ten-day intervals—gave only about 6 per cent. of relapses within a year's observation. In June, 1924, the *Société de pathologie exotique* recommended the adoption of this new method, and on his return to Africa in September, 1924, the author decided to put it into operation. Up-to-date information is available concerning two districts—the middle Congo and the Oubangui.

In the middle Congo 192 cases were treated and 34 (17 dead and 17 absent) were not re-examined ; in the remaining 158 examination of the blood was negative in every case ; more detailed examination, such as blood centrifugation, gland puncture and spinal puncture, was not made. These results were obtained a year after the injections.

In the Oubangui the patients were re-examined 14 months after the course of injections : of 60 in the first stage 3 per cent. exhibited parasites in the blood and of 40 in the second stage 7·5 per cent. had blood relapses.

The author considers these observations to justify the method and he has given instructions for its adoption to the exclusion of all others.

W. Y.

LEDENTU (G.) & DAUDE (J.). Essai du traitement de la trypanosomiase humaine par le 270 Fourneau. **[Treatment of Trypanosomiasis by Fourneau 270.]**—*Ann. Inst. Pasteur.* 1926. Oct. Vol. 40. No. 10. pp. 830–845.

Fourneau 270 is one of the series of phenylarsenic acids studied by TRÉFOUEL and TRÉVISE. It is the sodium salt of acetyl-p-amino-o-oxyphenylarsenic acid and is a white powder readily soluble in water. The authors used a 20 per cent. solution prepared at the time and injected it subcutaneously. The injections are painless and absorption is rapid ; no abscess formation or local irritation occurs when solution is complete, but when some of the drug remains undissolved there is a mild local inflammation. Experiments on mice showed that the ratio of the curative to the toxic doses is as 1 is to 12·5.

Preliminary observations made by LAIGRET at the Institut Pasteur, Brazzaville, indicated that in the first stage of sleeping sickness the dose of ·001 gm. per kilo led to the disappearance of trypanosomes from the glands in 48 hours and that the sterilization lasted 11 days; with doses of ·005 gm. per kilo the trypanosomes disappeared from the glands in less than 21 hours and reappeared, not in the glands, but in the peripheral blood, between the fourth and fifteenth days; and finally with doses of ·01 gm. per kilo the glands diminished in size and after the third day became sterile, but parasites reappeared in the blood between the twentieth and twenty-ninth days.

The authors recommend the administration of gradually increasing doses commencing with 1·5 cgm., 2 cgm., 2·5 cgm., 3 cgm. and gradually working up to as much as 5 cgm. or 6 cgm. per kilo. of body weight. The injections should be given at about weekly intervals. Of 15 patients in the first stage of the disease thus treated 2 died apparently as the result of 4 cgm. doses—an accident which it is stated should easily be avoided by prudent technique—2 relapsed and 11 remained sterile during an observation period of from three to six months after having had quantities varying from 2 to 28 cgm. per kilo.

In patients of the second stage the preliminary observations of LAIGRET have shown that the drug exerts a profound influence on the meningeal reaction. Even a single injection of such small doses as 1 cgm. or 1·5 cgm. per kilo. may lead to disappearance of the trypanosomes and to a marked decrease of albumin and lymphocytes. In all, 33 patients of the second stage have been treated by LAIGRET and TRÉVISE and by the authors. One of these was at the commencement of the second stage, and after two small doses of the drug the spinal fluid became normal within three months, the lymphocytes falling from 70 to 4 per cmm. In patients definitely in the second stage with marked changes in the spinal fluid, the results were very good. In those cases exhibiting advanced symptoms such as somnolence, tremors and inco-ordination, the results are very important. They comprise 19 cases, of which 4 are dead, 1 is blind, 1 has amblyopia, 1 relapsed, 7 are ameliorated and 5 are cured as judged by return to normal of the spinal fluid. Details of a number of typical cases are given.

Dealing with untoward symptoms and accidents resulting from the drug, the authors state that of the first, fever and cephalalgia are the most common, although temporary loss of weight is often observed during the course of injections. Abdominal pains and vomiting are indications to stop the treatment. The accidents are those common to arsenicals, viz., ocular troubles and death. As the result of their experience the authors consider that in the first stage of the disease it is essential to start with small doses working up rapidly to such large doses as 6 cgm. to 8 cgm. per kilo of body weight: the total quantity given should be at least 30 cgm. per kilo. In patients of the early second stage, the authors have often reached the dose of 5 cgm. per kilo without bad effects; good results have been obtained with a total quantity of 25 cgm. per kilo. In patients of the late second stage the reactions are much more variable and impose caution; the best results have been obtained with total doses of 20 to 25 cgm. per kilo. Finally, in patients very advanced in the last stage of the disease the doses must be extremely small, e.g., 1 cgm., 1·5 cgm., 2 cgm. and

2·5 cgm., and the total quantity should not exceed 10 to 15 cgm. per kilo.

The authors conclude that " Fourneau 270 " is a powerful trypanocidal agent. Its action in cases of the first stage is a little uncertain, but it is as yet premature to form a definite conclusion ; but its action on cases in the second stage is superior to that of atoxyl and comparable with that of tryparsamide.

W. Y.

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VAN DEN BRANDEN (F.). Suite de l'observation de quelques trypanosés traités au Bayer 205. [**History of Sleeping Sickness Patients treated by Bayer 205.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. pp. 227–230. [1 ref.]

In this paper the later history is given of seven patients in the first stage of sleeping sickness—fever, enlarged glands and spinal fluid containing not more than 15 cells per cmm.—who had been treated with 3·5 gm. of " Bayer 205." The observation of these cases has lasted for at least 3 years after treatment. All these patients can now be regarded as definitely cured. Special attention is drawn to two of the patients who relapsed with trypanosomes in the blood some weeks after the end of treatment and who, after showing parasites irregularly for some months, finally lost their trypanosomes without further treatment and have remained negative for two years since the last appearance of parasites. [For the earlier history see this *Bulletin*, Vol. 22, p. 135].

W. Y.

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LEDENTU (G.). Sur le pouvoir protecteur du sérum sanguin vis-à-vis du *T. gambiense*, après injection de " 309 Fourneau." [**Protective Power of Blood Serum against** *T. gambiense* **after Injection of Fourneau 309.**]—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 838–844.

The author has undertaken experiments to ascertain whether the serum of men and cattle treated with " Fourneau 309 " exerts a protective action against *T. gambiense* as has already been shown to be the case with " Bayer 205 " by MAYER and ZEISS.

The conclusions are :—

The serum of an ox treated with " Fourneau 309 " and injected with *T. gambiense* into a guineapig protects it against infection when the serum has been withdrawn within 48 hours of the injection of the drug.

The minimum protective dose is 1 cc. of serum for a standard dose of the virus.

When mixed with a standard dose of the virus in quantities of ·1cc. and ·2 cc. the serum neither protects nor prolongs the incubation period, but it retards the progress of the disease, especially when it has been withdrawn within 48 hours of injection of the drug.

When withdrawn four days after injection of the drug, the serum no longer protects, even in doses of 2 cc., against a standard dose of the virus ; it simply prolongs the incubation period by some days.

The protective action of the serum is in proportion to the quantity of drug in the circulation ; the elimination of the drug is rapid during the first two or three days, but then becomes slow as is shown by the fact that serum withdrawn 14 days after administration of the drug is similar to that withdrawn 4 days afterwards.

The protected animals are not immunized against a large inoculation of the same virus, but the incubation period is prolonged in direct proportion to the shortness of the interval which elapsed between injection of the drug and withdrawal of the serum; and the duration of the infection is similarly prolonged.

W. Y.

KELLERSBERGER (E. R.) Traitement de la maladie du sommeil par la tryparsamide. Observation de 100 cas. [**Treatment of Sleeping Sickness by Tryparsamide, 100 Cases.**]—*Bull. Méd. du Katanga.* 1926. Dec. Vol. 3. No. 4–5. pp. 132–150. [3 refs.]

During the last two years about 1,000 cases of sleeping sickness have been treated at the Bibanga hospital of the American Presbyterian Congo Mission. The patients were drawn from a radius of over 200 km. A camp established near the hospital rendered possible the treatment and careful observation of the cases. The drugs used were atoxyl, soamin, "Bayer 205," and tryparsamide. The results obtained with "Bayer 205," are given in a previous article [this *Bulletin* Vol. 23, p. 906], and it is with those obtained with tryparsamide that the present paper is concerned.

The patients were divided into four classes. The first comprises early cases without marked clinical symptoms and without change in the central nervous system; the second contains cases with slight changes in the spinal fluid accompanied by slight symptoms of invasion of the nervous system; the third category includes cases with important changes in the spinal fluid and grave clinical symptoms; and the fourth comprises very advanced cases which had been previously treated with other drugs and had relapsed.

Each patient was weighed on admission to hospital, and a thick blood film, gland juice, and spinal fluid examined. Most cases, 75 per cent., were diagnosed by gland puncture, about 15 per cent. by blood examination and a number of the very advanced cases by lumbar puncture. In all recent cases the trypanosomes were found most easily in the blood. At the beginning of the second period, when the glands are enlarged, the parasites are numerous (3 to 4 to a field) in the blood and gland juice. As the glands decrease in size and become gradually indurated, the chances of finding trypanosomes are much smaller.

The quantity of the drug given varied in each case; patients in an advanced stage are less tolerant and a much smaller dose is accordingly indicated. Accidents, as a result of the injection, were very rare; there was only one case of blindness from too large doses of the drug; a few cases exhibited temporary derangement of vision, but on decreasing or stopping treatment this subsided. The other untoward sequelae were trifling and very rare.

The results obtained are very encouraging and much better than with any of the other drugs. Some of the cases which were at the time of treatment desperate or *in extremis*, and others which were violent, or irresponsible, or degenerate, have become new men and women. Further observation suggests that they have been completely cured—some of the cases have been observed for more than a year and others for nine months. The native himself is greatly impressed and readily submits to such operations as lumbar puncture.

All the hundred cases treated are alive and well except one woman who had a hemiplegia as the result of the disease. The results of treatment in 48 cases—12 belonging to each group—are clearly set forth in 4 tables, which give the number, name, sex and age period of the patient, the number and quantity of injections of the drug given, the weight of the patient immediately before and after treatment and four months later, and the state of the spinal fluid as regards its appearance, protein content, and cell content, before, and immediately after treatment, and also at one or two subsequent periods 3 to 9 months later, and finally the general clinical state of the patient at the time of writing.

[This paper is a valuable one ; the data are clearly set out and it is to be hoped that the cases will be followed up and the information published in a more generally accessible journal.]

W. Y.

VAN DEN BRANDEN (F.). Note préliminaire sur les essais de traitement de la trypanosomiase humaine chronique par l'acétylarsan. [**Trial of Acetylarsan in the Treatment of Chronic Trypanosomiasis.**] —*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 218–221.

Acetylarsan is the oxyacetylaminophenylarsenate of diethylamine U. R. It can be injected under the skin and into the muscles without pain. The therapeutic action of the drug was tested in ten cases of chronic trypanosomiasis. The observations have not yet been carried to a sufficient length to enable definite conclusions being drawn, but it appears that, thanks to its neurotropic action and the ease of its administration, the drug is useful in the treatment of chronic trypanosomiasis, but it is doubtful whether it is so useful as tryparsamide.

In the discussion which followed this paper, MESNIL remarked that LEDENTU and VAUCEL at Brazzaville had found the drug less useful than the ordinary remedies, viz. atoxyl in the first period and tryparsamide in the second.

W. Y.

VAN DEN BRANDEN (F.). Le "Heyden 661" ou antimosan dans le traitement de la trypanosomiase humaine. [**Antimosan in the Treatment of Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 688–691. [2 refs.]

In contrast to stibenyl and stibosan (" Heyden 471 "), which contain antimony in the pentavalent form, antimosan (" Heyden 661 ") contains trivalent antimony. An aqueous solution is neutral and can be introduced into the muscles without appreciable pain, and injections made under the skin of the back are likewise not painful. The therapeutic action of the drug was tested in eight cases of sleeping sickness, details of which are given. It was found to be less energetic than tartar emetic and furthermore its action was transient. The general condition of the chronic cases treated by the drug rapidly got worse, and the conclusion is reached that antimosan, no more than stibenyl or stibosan, can replace emetic in the therapy of sleeping sickness.

W. Y.

LEVADITI (C.), NICOLAU (S.) & GALLOWAY (I.). Essais de prophylaxie des trypanosomiases par des dérivés phényl-arseniques administrés *per os.* [**Prophylaxis of Trypanosomiasis by Phenyl Arsenic Derivatives by the Mouth.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 737–746. [1 ref.]

Amongst the phenyl derivatives of pentavalent arsenic studied by the authors, tryparsamide and " Fourneau 270 " administered *per os* exert a most efficient prophylactic action against nagana infection in rabbits. Stovarsol and " Fourneau 192 " are distinctly less useful in this respect. Tryparsamide seems superior in its preventive properties to " Fourneau 279 " in view of the fact that it results in the blood and spleen of the treated rabbits remaining always negative as indicated by inoculation into mice, whereas this was not always the case in rabbits which had been given " Fourneau 270." The prophylactic doses used by the authors were in the case of both drugs in the region of the dose which the animals could tolerate.

The authors infer from these experiments that sleeping sickness prophylaxis by the oral administration of drugs is possible, and suggest that in the case of human beings the drugs should be given by the mouth in small frequently repeated doses.

W. Y.

SCHUMACHER (C.). Tierexperimentelle Beiträge zur Nagana- und Lueserkrankung und zur Heilwirkung des Salvarsans. [**Experimental Observations on Nagana and Syphilis and on the Curative Action of Salvarsan.**]—*Arch. f. Dermat. u. Syph.* 1926. Nov. 13. Vol. 152. No. 1. pp. 211-238. [72 refs.]

In the experiments described in this paper, the author used a strain of *Trypanosoma brucei* obtained from MORGENROTH at the Robert Koch Institute, Berlin; and three strains of spirochaetes of which one was the so-called " Truffivirus " obtained from PLAUT and MULZER at Munich, and the other two isolated by the author himself from cases of human syphilis.

The following summary of this paper is given :—

1. The infection in mice caused by inoculation of the trypanosome strain used by the author followed the usual course.
2. The disease in rabbits resulting from weak intracutaneous injection followed regularly the characteristic course described by Stühmer and exhibited clinical separation into primary and secondary stages.
3. Superinfection of nagana infected rabbits was successful only in the first stage and at the commencement of the second stage.
4. As has already been shown by Stühmer the curative dose of salvarsan was in the secondary stage about six times as great as in the primary stage.
5. Examination of the blood for arsenic showed that after intravenous injection of neosalvarsan the quantity of arsenic rapidly falls and that this is especially the case in the first few minutes after the injection.
6. Definite quantities of arsenic were found in the spinal fluid after large intravenous injections of neosalvarsan; the greatest amount was found 60 to 120 minutes after injection.
7. This arsenic showed in animal experiments a definite although feeble parasiticidal power.
8. Subcutaneous and intramuscular injections of neosalvarsan were in mice more toxic than intravenous injections.
9. Subcutaneously and intramuscularly injected neosalvarsan is, after the administration of sufficiently high doses, present in the blood 10 to 15 minutes later in such high concentration that it is possible to cure nagana infected mice with it.
10. Therapeutic experiments with the blood of animals, which have been treated intravenously with large doses of neosalvarsan, were curative when withdrawn within half an hour for nagana mice, within two hours for syphilic rabbits and within three hours for nagana rabbits.
11. This curative result is dependent on the presence of salvarsan or arsenic compounds in the circulating blood. Besides this, however, it is

probable that one has to reckon with active substances produced by the blood donor as the result of stimulation of the arsenic, which of themselves do not suffice to produce any recognisable effect. Their therapeutic power must be quite small in proportion to that of the arsenic or salvarsan combinations. The author believes that results obtained with salvarsan containing blood are directly due to the salvarsan itself.

W. Y.

BRUYNOGHE (R.) & DUBOIS (A.). Action thérapeutique du paraglycinamide-phenylarsinate de sodium dans l'infection à trypanosome inopinatum de *Rana esculenta*. [**Therapeutic Action of Paraglycinamide-phenylarsinate of Sodium in** *T. inopinatum* **Infection.**] —*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. pp. 231–234. [1 ref.]

The authors have studied the action of a recent arsenical derivative —the paraglycinamide-phenylarsinate of sodium (Tryponarsyl Meurice) on *T. inopinatum* of the green frog. The conclusions are :—

1. Tryponarsyl has a therapeutic action on *T. inopinatum* (in doses of ·5 cgm. per gramme). Possibly repeated doses might lead to definite cure.

2. The drug has no action on *T. rotatorium*.

3. *In vitro* the drug in the concentrations of 1 in 100 and 1 in 200 has no action in 18 hours on the motility of the trypanosomes.

W. Y.

SCHNITZER (R.). Ueber den Antagonismus trypanocider Heilmittel. [**On the Antagonism of Trypanocidal Drugs.**]—*Klin. Woch.* 1926. June 11. Vol. 5. No. 24. p. 1090. [1 ref.]

——. Untersuchungen zur Chemozeptorentheorie. I. Das Interferenzphänomen von Browning und Gulbransen. [**Investigations on the Chemo-Receptor Theory. I. The Interference Phenomenon of Browning and Gulbransen.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. May 5. Vol. 47. No. 2. pp. 116–133. [11 refs.]

—— & ROSENBERG (E.). Untersuchungen zur Chemozeptorentheorie. II. Die Hemmungswirkung des Parafuchsins gegenüber trypanoziden Arsenikalien. [**II. The Inhibiting Action of Parafuchsin on Trypanocidal Arsenicals.**]—*Ibid.* July 30. Vol. 48. No. 1. pp. 23–33. [1 ref.]

—— & SILBERSTEIN (W.). Untersuchungen zur Chemozeptorentheorie. III. Die Hemmungswirkung des Parafuchsins gegenüber Brechweinstein. [**III. The Limiting Action of Parafuchsin on Tartar Emetic.**]—*Ibid.* Dec. 23. Vol. 49. No. 5. pp. 387–392. [3 refs.]

—— & ROSENBERG (E.). Untersuchungen zur Chemozeptorentheorie. IV. Vergleich des Interferenzphänomens an parafuchsinfesten und normalen Trypanosomen. [**IV. Comparison of the Interference Phenomenon in Parafuchsin-Fast and Normal Strains.**] —*Ibid.* pp. 393–399. With 3 curves in text. [3 refs.]

In 1922 BROWNING and GULBRANSEN described a peculiar interference phenomenon which they had observed in the trypaflavin treatment of a strain of trypanosomes resistant to parafuchsin [this *Bulletin*, Vol. 19, p. 882.] This parafuchsin-fast strain was fully sensitive to trypaflavin ; if, however, the trypaflavin treatment was preceded by a parafuchsin feeding of the mouse, so that small quantities of parafuchsin were still present in the animal organism, the action of the trypaflavin was inhibited. This phenomenon, which is one of especial interest, requires to be brought into agreement with EHRLICH'S chemoreceptor theory. The classical observation on drug resistance shows that the point of attack of parafuchsin—a parachinoid dye—must be other than that of the arsenicals and of the orthochinoid dyes such as trypaflavin. Still more striking is the fact that the observations were made on a parafuchsin-fast strain, in which, according to accepted views, the avidity of the parafuchsin receptors is reduced to a minimum.

Experiments confirmed completely the observation of BROWNING and GULBRANSEN. Instead, however, of feeding the mice with parafuchsin, it was injected in watery solution thereby rendering possible a quantitative estimation of the inhibition of the trypanocidal action of trypaflavin. Reference is made to two somewhat comparable observations, viz., that of MORGENROTH and ROSENTHAL, on the inhibition of the action of tartar emetic by potassium hexatantalate, and that of VOEGTLEIN on the inhibition of aminophenyl arsenoxide by sulphhydryl compounds. There is an essential difference between the limiting of the effect of trypaflavin by parafuchsin and the other two inhibitory phenomena. Potassium hexatantalate acts, at least in a small degree, as antidote to tartar emetic; the suphhydryl compounds neutralize arsenoxide in very high degree. On the contrary the toxic action of parafuchsin combines with that of trypaflavin and the arsenicals; and there thus exists a synergism of toxic action with an antagonism of trypanocidal action.

With parafuchsin-fast strains the antagonistic action of parafuchsin also extends to the arsenical compounds arsacetin and salvarsan. The quantitative differences in the limiting action of parafuchsin, within the first four hours after parafuchsin treatment, against definitely active amounts of trypaflavin, arsacetin, and salvarsan are given in a table. The figures show that measured by the limiting concentration of the parafuchsin, the trypaflavin is most strongly influenced, less so arsacetin and least of all salvarsan. The quantitative differences in the limitability of the trypanocidal activity of these three substances rests obviously on differences of avidity which can be estimated on the basis of the numbers obtained.

The limitation of the trypanocidal action of trypaflavin, arsacetin and salvarsan by parafuchsin occurs also—with certain quantitative differences—with normal trypanosome strains fully sensitive to all the drugs concerned.

The significance of these phenomena on the basis of the chemoreceptor theory must be traced back to a complex structure of the chemoreceptor, a subject which has already been incidentally referred to by EHRLICH. A critical analysis of the experiments and theoretical considerations arising out of them are dealt with in the subsequent papers.

W. Y.

DURHAM (F. M.), MARCHAL (J.) & KING (Harold). **Some Observations on the Trypanocidal Action of Arsenicals.**—*Jl. Pharm. & Experim. Therap.* 1926. Sept. Vol. 28. No. 3. pp. 341–349. [11 refs.]

The views of EHRLICH regarding the mode of action *in vivo* of arylarsinic acids (atoxyl type) and VOEGTLIN and SMITH'S explanation of the activity of arylarseno-compounds (salvarsan type) imply that neither type is directly parasiticidal, but that in the tissues the former are reduced and the latter oxidized to the active agents the arylarsenoxides, thus:—

$R{-}AsO\,(HO)_2$—reduction→ R.AsO ←oxidation—R.As : As.R.

It has been shown by one of the present authors that these views are applicable to more complex arylarsinic acids of Type I (I) $R^1.CO.NH.\ R.AsO.\ (HO)_2$. (II.) $R^1.SO_2.NH.R.AsO\ (HO)_2$ having as a common feature the link—CO.NH— When, however, in the same complex this link is replaced by the analogous sulphonamide group—$SO_2$.NH—as in type (II) the products exhibit no trypanocidal action *in vivo* or *in vitro* and in the one case where the reduction products of the acid were examined, viz., aminotoluenesulphonylaminophenylarsinic acid, the corresponding arseno-compound is also inactive under both conditions, whilst the arsenoxide though inactive *in vivo* renders trypanosomes non-infective *in vitro* at dilutions of 1 in 10,000 and 1 in 40,000 in 30 and 300 minutes respectively.

It is suggested that the reduction potential of the tissues is insufficient to reduce the sulphonamide type of arsinic acid to the arsenoxide and that, conversely, injected arsenoxide is oxidized to the inactive acid.

T. A. Henry.

BROWNING (C. H.), COHEN (J.B.), ELLINGWORTH (S.) & GULBRANSEN (R.). **Aminostyryl Quinoline and Aminoanil Quinoline Compounds. A New Group of Trypanocidal Agents.**—*Jl. Path. & Bact.* 1926. July. Vol. 29. No. 3. p. 317. [2 refs.]

Quinoline methochlorides having an aminostyryl—or dimethylaminostyryl group substituted at position 2 and an acetylamino group at position 6, or with these substituents interchanged in position, exhibit marked trypanocidal action in the infection of mice with *Tr. brucei* (two strains used, one being "Prowazek"). The chemotherapeutic index for subcutaneous injections, 24 hours after infection, is 50 :1, but the compounds act irregularly and a dose one-sixth of the maximum tolerated may prove ineffective. Dourine infections also respond but are less easily influenced.

The trypanocidal action disappears with the absence of the amino-group from the quinoline nucleus; its replacement by a methyl group increases the toxicity and the hydrochlorides, as distinct from the methochlorides, are without trypanocidal action. The latter increases and the toxicity falls when the amino-group is acetylated.

Rabbits with *Tr. brucei* infection well developed have been cured by a single subcutaneous dose (0·02 to 0·025 gramme per kilo body weight) of 2 (*p*-aminostyryl)-6-acetylaminoquinoline methochloride or 2 (*p*-acetylaminostyryl)-6-dimethylaminoquinoline methochloride. A strain of trypanosomes tested in mice and found resistant to one of the above compounds proved susceptible to moderate doses of tryparosan or "Bayer 205."

The anil analogues of the styryl derivatives are less toxic but also weaker trypanocides.

T. A. Henry.

KLIGLER (I. J.) & WEITZMAN (I.) **Susceptibility and Resistance to Trypanosome Infections. I. Attempts at Immunization with Dead and Attenuated Trypanosomes.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 147–160. [6 refs.]

There is little doubt that there exists a type of immunity or resistance to malarial parasites, but the mechanism of this immunity or resistance is still obscure. Experimental investigation in this disease is difficult, and consequently the authors have attempted to study the mechanism of susceptibility and resistance to a protozoon infection, a trypanosome pathogenic for laboratory animals. The parasite used was *T. evansi* isolated from an infected mule; this produces in rabbits a chronic relapsing disease.

In a previous communication (this *Bulletin*, Vol. 23, p. 56) the authors showed (1) That by the usual procedure it is not possible to demonstrate humoral parasiticidal antibodies; (2) that there is a definite change in the leucocyte picture during the course of the disease; (3) that by disturbing the leucocyte balance by the injection of olive oil a relapse or blood invasion may be produced at will; and (4) that animals cured with "Bayer 205" acquire an absolute resistance, of greater or lesser duration, to a re-infection.

As a result of this work it was inferred that in the course of the infection the resistance offered to the invasion of the blood stream is repeatedly broken down (probably by substances liberated by the parasites which continue their activity in the tissues), and trypanosomes penetrate into the circulation and go through a period of active development. The destruction of the trypanosomes in the circulation leads to a partial immunization resulting in a disappearance of parasites from the circulation. This assumption pre-supposes a double property of the parasitic cell; one sensitizing, the other immunizing.

The object of the present work was to ascertain whether by the injection of dead and attenuated parasites it is possible firstly to simulate the changes observed in the host during the natural course of an infection, and secondly to increase the resistance of the host to infection. The experiments were of two kinds, the first dealing with the sensitization of animals by the injection of dead trypanosomes and trypanosome extracts, and the second with the resistance of animals treated with trypanosomes suspended in "Bayer 205."

The repeated injection of whole or autolysed trypanosomes fails to increase the resistance of the animal, but on the contrary renders it hypersensitive in so far as invasion of the peripheral blood is concerned. The most striking effect is produced by a long series of injections of whole heat-killed trypanosomes. These injections seem in no way to have modified the later course of the disease, except that the treated animals more often showed marked swelling and oedema, a condition which is found in untreated animals only after the disease has progressed for some time and become chronic. The blood changes were studied during the preparatory treatment, pre-infection, and post-infection stages, as well as the cellular reaction in the peritoneal cavity subsequent to the infection.

Having failed to induce any sort of immunity by repeated injections of trypanosomes, either intact or autolysed, a series of experiments was undertaken to determine whether any immunity could be obtained by treating animals with a mixture of dead or attenuated trypanosomes and "Bayer 205." The results indicate that trypanosomes suspended in "Bayer 205" behave quite differently from those suspended in saline, and that the animals so treated, instead of becoming hypersensitive, develop a resistance quite distinct from that induced by the same quantity of the drug alone.

In so far as the experiments reported in this paper simulate the changes occurring in the infected animals, it appears that the manifestations of the disease are due to a progressive sensitization of the host by the parasite or its product. The periodic invasion of the blood stream seems to depend on the repeated breaking down of some barrier by the trypanosomes multiplying in the animal organism. In infected normal animals a period of incubation is required for sensitizing the animal before the peripheral circulation can be invaded. Similarly, the appearance of swelling and oedema is due to a prior sensitization by the trypanosomes or their products. In animals previously treated by the injection of the same strain of trypanosomes, killed, attenuated or disintegrated, swelling of the ears and eyelids occurs promptly after the infection simultaneously with the invasion of the circulation. When, however, the trypanosomes are injected with " Bayer 205 " an exactly opposite state is established in the animals. Instead of being hypersensitive, the animals manifest an increased resistance which sometimes is sufficient to ward off an infection. It is difficult to imagine what peculiar transformation is brought about by the drug which results in such markedly different reactions. It would appear that the drug combines in some way with the trypanosome cell, producing a heterogenic antigen capable of stimulating the formation of specific antibodies.

W. Y.

Kligler, (I. J.) & Weitzman (I.). **Susceptibility and Resistance to Trypanosome Infection. II. The Relation of Physical Environment to Host Susceptibility to Infection.**—*Jl. Experim. Med.* 1926. Sept. 1. Vol. 44. No. 3. pp. 409–417. [10 refs.]

In this paper the authors record observations on the effect of external environmental factors, as for example, light and moisture, on the susceptibility of the host to trypanosome infection and on the severity of the disease imposed.

The strain used was *T. evansi* isolated from infected mules; it invariably produced a fatal infection in guineapigs and rabbits. In the former the incubation period is constant, varying from 5 to 8 days; the intensity of the infection as measured by the frequency of blood invasion is also fairly constant, but the duration of the disease shows a tendency to seasonal fluctuations. In these experiments guineapigs of approximately the same weight were used. In general the animals used in a given experiment were first examined, and then subjected to the conditions of the experiment for some days prior to the infection; the changes due to the infection as such could, therefore, be distinguished from those produced by the exposure to light, darkness or moisture.

It was difficult to select a suitable criterion for decreased or increased susceptibility; the length of the incubation period is the most constant phenomenon, but the frequency and intensity of the blood invasion and the duration of the illness are also of value. It was first necessary to ascertain whether exposure to one or other of the conditions to be tested produced a measurable change in the host susceptibility. Guineapigs were exposed for various lengths of time to the action of direct sunlight and an equal number of comparable controls were kept in total darkness or under ordinary light conditions; in order to eliminate the heat factor other animals were exposed to direct sunlight whilst immersed in water baths.

Preliminary experiments were made to determine the effects of the exposure under the various conditions of the experiments on the temperature, white cell, and differential counts of the animals. The results are set forth in tables which show that an exposure of 15 minutes to direct sunlight raises the rectal temperature 1·5° C. or more, and changes the leucocyte formula. The temperature effect is temporary, lasting about 2 hours, but the blood cell change is more enduring and recovery is very slow. Insolation through a water bath produces none of these changes; the rectal temperature falls about 2·5° C., the blood cell formula remains unchanged, and there is an increase in the total leucocyte count.

Preliminary experiments show that exposure to the conditions described, even though of short duration, produced appreciable changes in the course of the infection. Exposure to direct sunlight for 15 minutes shortened the incubation period to 3 days, while in the animals insolated under water for the same period the incubation period was only two days and there was a prompt and heavy invasion of the blood. The duration and time of exposure made an appreciable change in the results in animals infected with the trypanosome. A single exposure of half an hour on the day of infection reduces the incubation period, and shortens the duration of the illness by about half. A longer exposure, 1 hour or more, may cause sudden death with acute symptoms. It was found that the animals kept in ordinary diffused light and especially those kept in total darkness were more resistant to the infection than those exposed for brief periods to the direct action of sunlight. Immersion, whether in direct sunlight or not, resulted in a definite lowering of the resistance of the guineapigs to infection.

W. Y.

THOMSON (J. G.) & ROBERTSON (Andrew). **Variations in the Virulence and in the Morphology of Certain Laboratory Strains of** *Trypanosoma gambiense* **and** *Trypanosoma rhodesiense* **isolated from Human Cases.** *Jl. Trop. Med. & Hyg.* 1926. Dec. 15. Vol. 29. No. 24. pp. 403–410. With 1 chart in text. [13 refs.]

Observations on five distinct strains of trypanosomes isolated during recent years from human cases, four of which were *T. gambiense* and one *T. rhodesiense*, showed that with the passage of time strains, mechanically transmitted, may change entirely in their morphological characters, and further, that under certain conditions the typical morphological features of the original strain can be obtained again. The history of the five strains is as follows:—

Strain H. A European infected at Mabang, Sierra Leone, in December, 1918; the strain was obtained by inoculating rats on February 20th, 1919.

Strain H2. Originated from the same patient on October 8th, 1920.

Strain J. A European infected in the Upper Kwilu district of the Belgian Congo in January, 1920; the strain was obtained by inoculating rats on June 1st, 1920.

Strain MA. A European apparently infected in Southern Nigeria in July, 1921; rats were inoculated on November 10th, 1921.

Strain M. A European infected in Northern Rhodesia in December, 1921; he was treated with "Bayer 205" during 1922 and on January 4th, 1923; the strain was obtained by inoculating rats.

The authors give the following summary of their observations:—

"(1) *T. rhodesiense* can be inoculated easily from man to rats. In Strain M parasites appeared in the blood of the rat five days after the injection of human blood. Strains of *T. rhodesiense* rapidly increase in virulence, and, by subinoculation, soon become stabilized. Strain M became stabilized soon after the sixth passage.

"(2) *T. gambiense* is much more difficult to establish in rats. Strains H2 and J took months to show in the peripheral blood of the original rats.

"(3) *T. gambiense* may become rapidly virulent to rats (*cf.* Strain H, which soon became stabilized, eventually killing rats in three days); on the other hand, it may become even less virulent by passage, as in the case of Strain H2, in which the twentieth, twenty-first and twenty-second animals lived well over a year each.

"(4) The variations in virulence of the three strains (Strains H2, J and MA) of *T. gambiense* followed a similar curve. First there was a sharp rise to the third and fourth passages, then a drop at the fifth and sixth. At the seventh or eighth passage there was a quick rise in virulence, which was maintained for about five passages, i.e., up to the thirteenth. Thereafter the fall in virulence was gradual until the nineteenth passage, when there was divergence.

"(5) Two strains of *T. gambiense*, isolated at an interval of nearly two years from the same human case, showed marked variation in their virulence. The first to be isolated (Strain H) became rapidly stabilized, and in two years was killing rats in three days; the second (Strain H2) finally became less virulent, the last three animals all surviving for more than a year.

"(6) This discrepancy in the relative virulence of these two strains (H and H2) possibly is due either to the difference of the lengths of time they inhabited the human host, or to the treatment which the patient H had received in the interval before the second strain was isolated.

"(7) *T. gambiense* may exhibit a peculiar latency, lying dormant, as it were, in subinoculated rats. This latency has been compared with 'cryptic' trypanosomiasis. For example, two rats inoculated with Strain J showed trypanosomes in their blood on one occasion sixteen days after inoculation, and did not show again for about five months. A similar latency may be observed in human cases as a result of drug treatment. When rats carrying the virulent, stabilized Strain M are treated with drugs, especially the arsenicals, the trypanosomiasis similarly may be dormant.

"(8) By mechanical transmission a strain of trypanosomes, maintained in a series of hosts of the same species, *usually* will exhibit increased virulence; on the other hand, the virulence may actually decrease, as in Strain H2, *T. gambiense*. By passage through a host of a species different from the usual, the virulence of a strain may be markedly modified, either diminished or increased.

"(9) It is suggested that in trypanosomiasis, among other actions, drugs may change the character of a host. Further, that such alteration in the host almost may be comparable to that obtained by injecting organisms from a host of the species in which the strain is usually mechanically maintained into a host of another species. This is exemplified in the patient H. Before treatment the organisms isolated from his blood were very virulent; after treatment they became very avirulent to the rats. In rats carrying *T. gambiense* (Strain MA) which were treated with halarsol, the strain rapidly became much more virulent during subsequent passages.

"(10) When either *T. gambiense* or *T. rhodesiense* are transferred mechanically from man to rats, at first the trypanosomes exhibit a well-marked polymorphism, with, in the case of the latter, the appearance of posterior-nuclear forms, but later this is lost. Up to a certain stage the polymorphic nature of the parasites can be made to return by transferring the strain from the usual host into a host of another species.

"(11) A return of the polymorphism and, in the case of *T. rhodesiense* posterior-nuclear forms, can be brought about by the action of drugs. The suggestion is that the return to the polymorphic character is not due so much to the action of the drug on the parasites as on the host."

W. Y.

ROBINSON (E. M.). **Serological Investigations into some Diseases of Domesticated Animals in South Africa caused by Trypanosomes.**—*11th & 12th Reports Director Vet. Education & Res.* Dept. of Agric. Union of S. Africa. Part I. 1926. Sept. pp. 9–25. [5 refs.]

Originally the intention was simply to apply the complement fixation test in the diagnosis of dourine in horses, but opportunity occurred of examining the reaction also in the diagnosis of nagana in cattle and other animals. The results obtained were of considerable value, as the animals in the nagana experiments were all inoculated with pure strains of either *T. congolense* or *T. brucei.* In addition to the complement fixation test, the Sachs Georgi and Meinicke lipoid fixation reactions were tried both in dourine and nagana.

*The complement fixation test.*

The technique employed for obtaining the antigen and for carrying out the complement fixation test is described in detail and is essentially the same as that devised by WATSON in Canada (1920). It was found :—

1. The complement fixation test may be used for the diagnosis of dourine occurring naturally in South Africa, provided *T. equiperdum* antigen is employed.
2. Animals infected with *T. brucei* react to the complement fixation test when *T. equiperdum* antigen is used.
3. Animals suffering from a pure *T. congolense* infection do not usually react when *T. equiperdum* antigen is used, though in rare cases a partial reaction may be obtained. In Table 2 it will be observed that cattle 317 and 101 each on one occasion reacted strongly. That this was exceptional is shown by the series of reactions in Table 5.
4. There is some evidence to show that sera obtained from animals with pure *T. congolense* infections may give marked reactions with *T. congolense* antigen. The sera of animals infected with *T. equiperdum* react slightly or not at all to this antigen.
5. The sera of a number of cattle showing pure infections with *T. vivax* did not give reactions to the complement fixation test using *T. equiperdum* antigen.

*The Sachs Georgi test.*

The technique employed for this test was the modification introduced by DREYER (1921). It was found that certain sera of nagana cattle gave quite marked reactions, but others none at all. A large number of dourine sera were tested, and in addition sera of rabbits and guineapigs infected with dourine and nagana, but the results were uniformly negative. With horse sera, whether from dourine or nagana cases, no trace of a reaction was obtained.

*The Meinicke lipoid fixation reaction.*

The technique employed was that of DAHMEN (1920). The results, which are set forth in a table, show that animals infected with *T. equiperdum* usually gave a strongly positive reaction with this test. Antigen made from dourine trypanosomes was used for the whole series. Animals infected with *T. congolense* might or might not react positively, but most of those infected with *T. brucei* gave positive reactions. The lipoid fixation reactions appears to be less specific than the complement fixation test ; whether it is more reliable for dourine than the latter, as is claimed by DAHMEN, cannot yet be regarded as certain.

W. Y.

KUDICKE (R.) & COLLIER (W. A.). Intrakutane Superinfektionsversuche an tsetsekranken Kaninchen mit Trypanosomen der gleichen Art. **[Intracutaneous Superinfection Experiments on Nagana Rabbits with Trypanosomes of the same Species.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Sept. 11. Vol. 29. No. 9. pp. 407–421. [7 refs.]

In these experiments the authors wished to ascertain how the skin of nagana rabbits reacted on intracutaneous injections of living trypanosomes of the same species; they further wished to find out whether there was any evidence that an alteration in the skin reaction stood in relationship to the formation of immune body, and finally they desired to obtain information regarding the destiny of parasites used for superinfection, especially when the cutaneous reaction was absent or in any way changed.

The authors used in their work three nagana strains, viz.: Strain B, nagana "ferox" of Ehrlich; Strain B1, from the Robert Koch Institut, and Strain T, which had been rendered blepharoplastless through acridin dyes. Strains B and T behaved differently to various drugs; Strain B was susceptible to arsenicals and to other drugs, but Strain T was resistant to arsenicals and also to trypaflavin and similar dyes. Further information regarding the three strains is also given.

The course of the infection in rabbits is described fully by RITZ and STÜHMER. On intravenous injection after an onset of 3 or 4 days there follows a negative period during which trypanosomes are absent from the blood, then they reappear and remain until the animal's death. During the whole period, however, the parasites are scanty, except before death, when they are more numerous. In the relapse periods the trypanosomes in the blood exhibit numerous modifications whereby they are distinguished from the "primary strain" and from one another by their antigen behaviour. On intracutaneous inoculation the parasites multiply *in situ* for three days, and then, coinciding with the development of the primary signs, e.g., local gland swelling, they appear in the blood. On about the seventh day they disappear from the blood and the local signs subside; on the ninth day the relapse period begins and is accompanied by the development of the secondary signs. Up to the sixth day the trypanosomes from the primary lesions, the glands and the blood have the character of the primary strain. STÜHMER, who studied the subject in detail, found no antibody in the blood on the fourth day, small amounts on the eighth day and full formation on the thirteenth day.

In the authors' experiments the course of the infection was in most respects identical with the above, but showed some deviations; whether these were due to technique or to the strains used is unknown. The authors always made their intracutaneous inoculations in the back, as they had to use female animals. For their purpose the time of the appearance of the local reaction, its intensity and duration are of importance. The lesions produced by the strains and the blood infections are described in detail.

The results of intracutaneous superinfection with the homologous strain of rabbits previously infected by the intracutaneous method are summarized in a table. It is seen that the normally strong local reaction occurs up to the 28th day, that in the later periods of artificially prolonged infection (through small doses of arsenophenylglycin) the local reaction very frequently fails or is quite transient, that such is the case, however, sometimes much earlier, and that at times reactions occur which are of only moderate intensity or are greatly delayed. Weak or failing reactions were more common with the blepharoplastless strain T than with the normal strain B, and this is explained on the grounds of the greater dermatotropism and arsenic susceptibility of the latter strain. Trypanosomes were always found at the place of superinfection, usually in the customary number when the local lesion was well-developed. When the local superinfected lesion was feeble, trypanosomes were either not found at all or only in much smaller numbers than normal. The later the superinfection the fewer positive results were obtained by puncture of the site.

In a second table are summarized the results of intracutaneous superinfection with heterologous strains of previously intracutaneously infected rabbits. In the great majority of cases a marked local reaction occurred. The heterologous strain was always seen in the local lesion and in the blood stream, where it was found either mingling with the primary strain or alternating with it. The number of trypanosomes in the place of superinfection was, as a rule, less than that in a normal lesion, but higher than that found in superinfection of the homologous strain.

In the third table are given the results obtained by intracutaneous superinfection with homologous and heterologous strains in previously intracutaneously infected rabbits. In these cases the primary infection was, as a rule, prolonged by treatment, and between the 61st and 150th days the animals were superinfected in different places with the homologous and heterologous strains. In 6 of the 9 experiments the primary infection was the blepharoplastless strain T and in the remaining 3 the normal strain. In the majority of the heterologous superinfection places the reaction was well-marked, whereas the homologous lesions were all moderate or feeble. The authors believe that the simultaneous superinfection with the heterologous strain so alters the condition of the animal that the homologous strain more readily produces a reaction. The number of parasites found in both lesions was less than in the control animals, and as might be expected greater with the normal strain than with the blepharoplastless strain. In the blood the heterologous strain was always found ; the newly introduced homologous strain appeared to be inhibited.

From these experiments it appears that the homologous strain both at the site of superinfection and also in the blood is inhibited, and this is the more marked the later the superinfection is made. The longer the primary infection runs the more antigen is formed. The heterologous strains meet with less opposition than the homologous, as its chief antigen is different, and hardly ever is the inhibition so strong that the local reaction fails, whilst the absence of the heterologous strain from the blood never occurs.

In the uninfluenced tsetse infection of rabbits exhaustion of antibody formation occurs relatively early, as a rule, and this is signalized by a sudden swarming of the parasite in the blood. On this exhaustion of antibody depend in part at least certain of the anomalies observed in the authors' experiments.

Certain observations in the authors' experiments suggest that the skin has a unique position in the immunization processes. A series of experiments was performed in which the primary infection was given not intracutaneously, but intravenously. STÜHMER has shown that the chancre formation failed in animals which had previously been given the same strain intravenously and also when the intracutaneous and intravenous inoculations were made at the same time. The latter observation was not re-examined, but the authors' experiments substantially confirm the former.

Two rather considerable series of experiments of a similar nature were performed with heterologous strains ; the blepharoplastless strain T serving for intravenous injections and the normal strain B for intracutaneous infection. The two series of experiments were distinguished by the number of trypanosomes injected intravenously, in the one it was about 100 times greater than in the other. In the first series the results were quite definite—only one animal reacted in the usual manner, one in a modified form, one not at all, and the remainder in a transient manner. It follows, therefore, that heavy intravenous infection almost always exerts a very considerable inhibitory action even on the cutaneous reactions with the heterologous strain. In the second series the results were not so simple; five or six normal or almost normal cutaneous reactions were obtained, one modified reaction, two greatly delayed and two quite transient. In both series the interval between intravenous and intracutaneous infections was quite small. In both series of experiments as many trypanosomes were found in punctures of the superinfection site of animals with good reactions as in the controls; and even in those cases in which the reaction was slight the number of parasites found was not much diminished, and finally sometimes even when the reaction failed puncture of the superinfection site revealed the presence of many parasites.

Examination of the number of trypanosomes in the peripheral blood of the animals comprising these series showed that of ten with greatly modified skin reactions nine exhibited definitely more parasites in the blood than normally. In contrast, of 23 with marked reactions 18 showed a decrease, 4 a moderate increase, and only one a great increase of the number of parasites in the blood. Furthermore, in those animals in which there was only a quite transient cutaneous reaction, the heterologous strain used for superinfection was always found in the blood, whereas in the control animals examined at the same period the blood was often negative. Apparently, therefore, the heterologous intracutaneously inoculated trypanosome meets with less opposition in the blood of previously intravenously infected animals than in that of normal animals. The better the cutaneous reaction, the better the animal deals with the double infection: of the rabbits intravenously infected and later superinfected with the heterologous strain those which exhibited slight or no cutaneous reaction lived on an average 19·5 days, whereas those with marked reaction lived 31·8 days.

These experiments suggest that it is the immune processes resulting from the intravenous infection which prevent the cutaneous reaction and that when the intravenous infection is great the immune body influences also the heterologous strain. But against this is the fact that inhibition in the blood itself is not found, as is also the observation that in such animals as had a particularly heavy blood infection the cutaneous reaction was slight Possibly the skin plays a special rôle in the formation of immune body and this process is independent of the rest of the organism. The fact, however, that in certain animals, even when superinfected with a homologous strain, trypanosomes were multiplying at the site of superinfection, although no reaction was visible for a long period, indicates that the cause of the absence of reaction is not to be sought in the immunity process, but in the infection process. The authors believe that the cutaneous reaction in STÜHMER's experiments failed because the infection led to an alteration in the condition of the reacting cell systems, and they consider it probable that there is a change in their reaction capacity.

If this view be correct, two different processes operate in influencing the cutaneous reaction in superinfected animals: on the one hand, the specifically enriched immunization process, which influences the parasite and thereby limits the irritation, which consequently is only fully-developed after the disease has lasted sometime; and, on the other hand, the infection process itself which acts on the cells concerned in the inflammation. It is to be remarked that the latter process is active not only at the beginning of the infection, but also in later periods.

W. Y.

i. KRITCHEVSKY (I.) & AUTONOMOV (V.). Ueber Superinfection bei nichtsterilisierender Immunität. [**On Superinfection in Non-Sterilizing Immunity.**]—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 35. [In Russian, pp. 23–34. Refs. in footnotes.]

ii. KRITSCHEWSKI (J. L.) & HERONIMUS (E. S.). Weitere Studien ueber die Frage der nichtsterilen Immunität and der Superinfektion bei Trypanosomiasis. [**Further Studies on the Question of non-Sterile Immunity and Superinfection in Trypanosomiasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Mar. Vol. 31. No. 3. pp. 126–133. [3 refs.] Also in Russian in *Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. pp.142–152. [2 refs.] German summary p. 152.

i. The authors have shown that infection with *T. brucei* results in a non-sterile immunity, in respect of the same species and same strain of trypanosomes, in only a few animals. In the majority it fails, and one can produce superinfection in the infected animal.

The conclusions are :—

1. In experimental infection of the mouse with *T. brucei*, the so-called non-sterile immunity is not seen, or is found only exceptionally.
2. Consequently, superinfection with the same strain of species succeeds as a rule in the mouse.
3. In certain cases, however, superinfection fails and in such one must consider these animals as being in a condition of non-sterile immunity.
4. Superinfection may succeed in an animal more than once ; the absent non-sterile immunity may then in a given animal finally appear.

ii. The following conclusions are reached :—

1. Superinfection of animals infected with *T. brucei* or *T. equiperdum* can succeed not only with strains of the same species, which differ from the strain with which the organism was originally infected, but also with the identical strain.
2. Non-sterile immunity may or may not be present, independently of whether the strain used for the second infection is or is not identical with that used for the first.
3. The presence or absence of antibody is not related to the possibility or impossibility of producing superinfection of the infected animal.

W. Y.

STÜHMER (A.). Weitere Beiträge zur Kenntnis der Trypanosomenerkrankung des Kaninchens als Modellinfektion für Syphilis. (Fieberverlauf.–Serum–reaktion.– Seronegative und sero-positive Sekundärperiode.–Erreger im Hodengewebe.–Immunschwäche des Zentralnervensystems.) [**Further Contributions to Knowledge of Trypanosome Disease of Rabbits as a Model Infection for Syphilis.**] —*Arch. f. Dermat. u. Syph.* 1926. Dec. 31. Vol. 152. No. 3. pp. 738–750. With 12 text figs.

In view of the difficulties and expense attending experimental work on syphilis in rabbits, the author has studied trypanosomiasis in this animal as a paradigm of human syphilis. In his earlier experiments, he used nagana infection, but later dourine was employed, because in several respects this infection simulated syphilis still more closely. Whilst after local infection the course of the disease and the time of development were very similar in the two infections, yet the primary lesion in dourine was drier with an inclination to scab formation, whereas that in nagana was softer and more haemorrhagic.

On intracutaneous inoculation of the scrotum there was, as a rule, no change observable during the first three days, but from the third day onwards, the parasite appeared in the blood stream—the primary strain (primärer Ausgangsstamm). At the same time the local primary lesion developed with local glandular enlargement. From the fourth day onwards there was a gradually increasing development of antibody against the primary strain in the blood, so that in the course of six or seven days the parasites gradually disappeared from the blood and had gone by the eighth day. On the ninth day, parasites again commenced to appear in the blood and these were not susceptible to the antibody—serum-fast relapse strain (serumfester Rezidivstamm). Some days later—usually on the thirteenth or fourteenth day—the secondary appearances, such as skin changes, swelling of the genitals, eyelids, nares and ears, manifested themselves. Corresponding to the course of the rising antibody curve is the falling off of the superinfection, which is strongly positive on the fourth day, only weakly positive on the eighth day and on the thirteenth day simultaneously with the development of the secondary appearance is negative: " Anergie " is thus reached. The biological boundary between the primary and secondary stages of the disease is thus seen to occur on the eighth day, whereas the clinical symptoms of the secondary stage are not observable until the thirteenth or fourteenth day.

It was found that in the therapeutic sense a very important difference existed between the first and second stages of the disease. In the primary stage the " dosis sterilisans " of salvarsan was 5 mgm. per kilo. of body weight, whereas in the well-developed secondary stage the amount was 30 mgm.

Study of the temperature charts of 13 dourine locally infected rabbits showed a sharp rise of temperature on the fifth and sixth days, and then an equally sharp fall, followed on the eleventh or twelfth day by a further rise. It is thus seen that the temperature movements indicate the division on the eighth and ninth days between the two stages of the disease.

After considerable work, the author succeeded in elaborating a technique for performing the Wassermann test on rabbits infected with trypanosomiasis. It was found that normal rabbits always gave a negative reaction, whereas those showing pronounced secondary signs always reacted positively. Five animals locally infected were then examined regularly through the course of the disease and it was found that they gave negative reactions until the eleventh or twelfth day and from the thirteenth or fourteenth day they always gave positive reactions.

The author then proceeded to investigate whether the appearance of trypanosomes in the blood was accompanied by a penetration into the tissues. It was regularly found that in rabbits which were inoculated with *T. equiperdum* intracutaneously on the left scrotum parasites were to be found in the testicular substance not only in the second stage of the disease, but also in the first. Details of one case are given: in this animal trypanosomes were found in numbers in the right testicle on the fifth and sixth days, then corresponding to their disappearance from the blood they were absent from the testicle until the twelfth day, when they reappeared once more both in the blood and testicles. Experiments showed that the strain obtained from the right testicle during the fifth and sixth days before any obvious changes had occurred in the testicles corresponded with the primary strain from the blood, in that both were sensitive to the action of the immune serum, in contrast to the serum fast relapse strain obtained from the blood during the secondary period.

Applying these analogies to human syphilis he sums up the process of the latter disease as follows:—

Primary effect, regional gland swelling, blood invasion of the primary causal agent and elective multiplication of this in especially susceptible tissues (testicles). After the critical days there follows first a sero-negative period which in turn is followed, after the appearance of the tissue reaction, by a sero-positive secondary period.

The fact that the causal agent can settle down in the body tissues in the primary stage of the infection gave the author the idea that possibly also the central nervous system may be a tissue in which the parasite can settle in the primary stage. As a working hypothesis, the author assumes that the nervous system is invaded before the first secondary appearances, and that then a branching out of both processes takes place. On the one hand, the body infection continues with its cutaneous manifestations and manifold relapses, and on the other the nervous infection goes on its own way. Numerous relapses with marked tissue reaction and corresponding strong immune body formation must exert some influence on the nervous infection. One can assume that under such conditions the nervous infection is inhibited, whilst on the contrary a speedy disappearance of the body infection may be favourable to the development of the nervous infection. Experience suggests that it is the mild syphilis which leads to tabes and general paralysis, whereas syphilis with numerous and severe cutaneous lesions does not result in nervous disease.

The author has succeeded in isolating and maintaining the parasite from the nervous system and found its virulence distinctly lessened; in inoculating it back from rats to rabbits, it appeared to have the elective property of again seeking out the nervous system. It is probable that in the nervous system the organism finds quite special conditions of life. In the spinal fluid of rabbits, which as the result of severe secondary symptoms developed in their blood powerful immune body against the primary strain, no trace of immune body was found.

W. Y.

SAVINO (E.). Rélation entre le nombre des trypanosomes et les variations glycémiques dans l'infection expérimentale par *Trypanosoma equiperdum*. **[Relation between Number of Trypanosomes and Glycaemic Variations in Experimental** *T. equiperdum* **Infection.]**—*C. R. Soc. Biol.* 1927. Jan. 28. Vol. 96. No. 3. pp. 220–221.]

This work was suggested by the observations of SCHERN. Dogs were inoculated with a very active strain of *T. equiperdum* and the variations in the number of trypanosomes in the peripheral blood was observed under the following circumstances—(1) During the action of insulin, and (2) under the influence of an injection of glucose and insulin, or of glucose alone. The author has also examined the sensitivity of the infected dogs in regard to insulin, and finally he has endeavoured to establish a relationship between the glycaemia and the number of trypanosomes in the blood in the course of the infection.

It was found that an injection of insulin causes a diminution of glucose, and also in the number of trypanosomes. This decrease depends only on the hypoglycaemia, because a simultaneous injection of glucose and insulin results in a slight diminution or increase in the number of trypanosomes, according to the variations in the glycaemia. An injection of glucose alone is followed by an increase in the trypanosomes. The glycaemia diminishes less in infected dogs than in the controls; but the value of the glycaemia during the course of the infection does not remain in relationship to the number of trypanosomes in the peripheral blood.

W. Y.

DUBOIS (A.). Le phénomène de Kurt Schern dans les trypanosomiases. **[Kurt Schern's Phenomenon in Trypanosomiasis.]**—*C. R. Soc. Biol.* 1926. Nov. 5. Vol. 95. No. 31. pp. 1130-1133. [2 refs.]

The author has re-examined the phenomenon described by SCHERN [this *Bulletin*, Vol. 23, p. 428], and has reached the following conclusions:—

1. The pathogenic trypanosomes of mammals are paralysed when deprived of sugar, *in vitro*. This paralysis is easily curable—provided it is not of too long duration—by the addition of glucose, laevulose, or in less degree by maltose and galactose. Glycerine has the same favourable action.

2. As Schern has shown, the lability of the trypanosomes is dependent upon the failure of sugar and is of prognostic value; it becomes the more marked the nearer the host is to death.

W. Y.

DUBOIS (A.) & BOUCKAERT (J. P.) L'hypoglycémie au cours des trypanosomiases expérimentales à *Trypanosoma brucei*. [**Hypoglycaemia in the Course of Experimental *T. brucei* Infection.**]—*C. R. Soc. Biol.* 1927. Feb. 18. Vol. 96. No. 6. pp. 431-433. [1 ref.]

In this work the authors have studied the carbohydrate metabolism in the course of experimental infection of animals with *T. brucei ugandae* The conclusions are:—

1. In the course of infection with trypanosomes there is a notable hypoglycaemia, chemically detectable, in the animal.
2. The physiological mechanism of this hypoglycaemia demands further research.
3. The rôle of the phenomenon in question in the clinical phenomena is either nil or very limited.

W. Y.

DWIJKOFF (P.). Zur pathologischen Anatomie und Morphologie des Blutes einer experimental Trypanosomiasis bei Meerschweinchen. [**The Pathological Anatomy and Morphology of the Blood in Guineapigs Experimentally Infected with Trypanosomes.**]—*Folia Haematologica.* I. Teil: Archiv. 1926. Sept. Vol. 33. No. 1. pp. 1–5. [21 refs.]

In this work the author has endeavoured on the one hand to obtain more precise information regarding the histological changes occurring in the bone-marrow, spleen and blood in experimental trypanosomiasis, and on the other hand to investigate the correlation of the activity of the haematopoietic organs—the marrow, spleen and lymph-glands—and the condition of the peripheral blood.

Thirteen guineapigs were inoculated subcutaneously with 1 cc. of nagana blood, and one with 1 cc. of blood from an animal infected with the camel trypanosome of Turkestan. The nagana guineapigs steadily lost weight until death occurred after periods varying from one to six weeks; the animal inoculated with the camel trypanosome lived four months. The whole organism was emaciated and cachectic, and the adipose tissue had disappeared. There existed pronounced hyperaemia of the peritoneum and in most cases a haemorrhagic exudate in the abdominal cavity. Punctate haemorrhages were found in the peritoneum and diaphragm, in the gastric mucosa, in the pericardium, pleura and lymph glands. In the brain, lungs, liver and intestine there was passive hyperaemia. The changes in the lymphatic system were striking. The spleen was, as a rule, three or four times the normal size; it was soft and the follicles stood out plainly, giving the appearance of a septic organ. All the lymph glands, especially the inguinal glands, were enlarged and in places exhibited central necrosis. The lymph vessels between the glands were changed into thick yellow cords. The heart, liver and kidneys exhibited parenchymatous degeneration. These macroscopic appearances gave the impression that one had to do with a wasting disease with a strongly pronounced reaction of the lymphatic apparatus, reminding one of a chronic sepsis.

Turning to the histological changes it was found that the striking macroscopic appearances of the lymphatic apparatus corresponded to microscopic alterations. In the spleen and lymph glands there was marked hyperplasia. Although the follicles were enlarged, there were no corresponding masses of lymphocytes; their centres had a clearer appearance since the reticular cells were strikingly enlarged and swollen and their intermingling with the lymphocytes gave the impression of a vacuolization of the follicle. The reticular cells had a large diffuse nucleus which appeared sometimes to be fragmented and reminded one of the giant cells of the marrow—the megakaryocytes. The lymph cells in the follicles showed changes, they were increased in size, their protoplasmic zone was broadened and their nuclei were clearer. In other words the changes characteristic of the so-called myeloid metaplasia were observed. In certain cases of longer duration the cells of the periphery of the follicle became lengthened and the follicle became fibrosed. The appearances of the bone marrow were marked hyperaemia, pronounced leucopoiesis, a mass of myelocytes, metamyelocytes and especially of eosinophil myelocytes. Giant cells, megakaryocytes, were very numerous; they were adherent to the vessel cells and showed evidence of nuclear degeneration. It is interesting to compare these changes with those of the peripheral blood. Blood counts showed neutrophils 7–12 per cent. and lymphocytes 80–92 per cent.; eosinophils were practically absent, as were also myelocytes and metamyelocytes. The appearance of the central haematopoietic organs hence did not correspond with those of the blood. No definite change was observed in the number of basophil leucocytes in the peripheral blood. The lymphocyte group was interesting: in general the small lymphocytes predominated, but at times the moderate-sized and large lymphocytes were present in considerable numbers (10–15 per cent.). Sometimes amongst these lymphoid group cells were encountered in numbers (up to 12 per cent.) which reminded one of micro- and meso- myeloblasts; they were distinguished from myeloblasts by their coarser nuclear structure. It is difficult to imagine that in the peripheral blood myeloblasts are present and that their subsequent developmental stages, myelocytes and metamyelocytes, are absent since so many of these are found in the bone marrow. These cells do not arise in the marrow, but in the centre of follicles of the lymphatics where such peculiar changes occur in them. They do not travel from the marrow to the peripheral blood, but the lymphatic system endeavours to restore the balance by assuming the function of the marrow and producing these cells, which resemble myeloblasts. The effort to assume the function of the marrow is further seen in the new formation of the reticular cells of the follicles which resemble megakaryocytes.

Leucocytosis was never observed, the large mononuclears never exceeding 6 per cent. The observations of certain previous observers on this point are erroneous, the mistake apparently arising from an enumeration of large lymphocytes. Nor is an increase in the large mononuclears to be expected since there is in trypanosomiasis no reaction of the reticulo-endothelial apparatus of the liver.

The author regards trypanosomiasis as a sort of sepsis which influences especially the blood forming organs and particularly limits the functions of the marrow. The lymphatic system reacts through hyperplasia and attempts to support the failing function of the marrow. True mononuclear leucocytosis is completely absent.

W. Y.

BATTAGLIA (Mario). L'edema nelle infezioni da tripanosomi. [**Oedema in Trypanosome Infections.**]—*Pathologica.* 1927. Feb. 15. Vol. 19. No. 424. pp. 64–65. [8 refs.]

In experimental infections by trypanosomes the author examined the thyroids and parathyroids of animals showing oedema, some of them early, others later.* In the former the thyroid was firm and surrounded by myxomatous tissue, in the latter the gland was also firm but reduced in size. The cells enclosing the follicles showed pyknosis and karyorrhexis, with vacuolated protoplasm, while the parathyroids were reduced to an "amorphous" state. He regards the oedema of trypanosomiasis as allied to myxoedema associated with a degenerative inflammation of the thyroid and parathyroid, and hypothecates similar involvement of other endocrine glands in sleeping sickness.

H. Harold Scott.

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BRUNI (N.). Observations et recherches sur *Trypanosoma lewisi* et *Schizotrypanum cruzi.* [**Observations on** *T. lewisi* **and** *T. cruzi.*] —*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 791–794. [2 refs.]

This paper records a number of isolated observations on *T. lewisi* and *T. cruzi.*

Of 103 rats (*Mus decumanus*) captured in the military hospital of Bologne 56 were infected with *T. lewisi.* The infection was not found to be more frequent in summer than in winter, but it appears to be of unequal distribution, *e.g.* in one building 90 per cent. of the rats were infected, whilst in another in the same hospital very few were infected. A female rat with a very heavy infection gave birth to three young ones, none of which was infected. No evidence of disease was discovered in two naturally infected rats kept in captivity for 6 weeks and 6 months, respectively. Four white rats placed in the same cage did not become infected, although the naturally infected animals were infested with lice and fleas. White rats were fed on infected organs, and did not become infected, but white rats inoculated with the trypanosome developed an infection which killed them in about a month.

Ectoparasites were not very common on the naturally infected animals. The fleas were *Ceratophyllus fasciatus* and the lice *Hematopinus spinulosus* ; flagellates were never discovered in their guts.

At the same time a number of similar observations were made on *T. cruzi.* Two pregnant guineapigs were inoculated and 16 days later aborted ; although parasites were plentiful in the blood of the parents the offspring were negative. Twelve mice (*Mus musculus* var. *albus*) were inoculated and died within three days ; in view of this susceptibility mice were fed on infected organs, but without result. Attempts to infect cold-blooded animals, *e.g.* frogs and toads, did not succeed.

W. Y.

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TALIAFERRO (William H.) & JOHNSON (Thurston L.). **Zone Phenomena in** *in vivo* **Trypanolysis and the Therapeutic Value of Trypanolytic Sera.**—*Jl. Preventive Med.* Chicago. 1926. Sept. Vol. 1. No. 1. pp. 85–123. With 1 text fig. [29 refs.]

In various *in vitro* serological titrations, it is a common occurrence to meet with "zones of inhibition" or Neisser-Wechsberg phenomena. These zones were discovered by NEISSER and WECHSBERG (1901) who, during the estimation of the bactericidal property of immune sera, made the observation that in the presence of a constant amount of complement and antigen (*Vibrio metchnikovi*) medium amounts of antiserum were completely bactericidal, whereas very large amounts of antiserum were no more bactericidal than small amounts. Thus paradoxically, they found that while medium doses were bactericidal, large doses of immune serum prevented the bactericidal action of the antibody.

The object of the present work is to show that " zones of inhibition " occur in *in vivo* trypanolysis; that is, if different sized doses of lytic sera are given to a series of mice previously infected with a pathogenic trypanosome, the medium sized doses will often produce lysis of the trypanosomes, whereas larger doses will cause no observable parasiticidal effects.

The methods of obtaining *in vivo* trypanolysis are described in detail; then, following data on the zone phenomenon with immune sera, several experiments are presented on the *in vivo* demonstration of trypanocidal property of normal human serum in which " zones of inhibition " were never observed.

The following conclusions of this long and rather technical paper are given :—

" 1. Serum taken from guineapigs or rabbits after infection with *T. equinum* and after the first trypanolytic crisis or from infected sheep during the chronic infection will often produce a trypanolytic crisis in mice previously infected with the passage strain. The length of life of such treated mice is prolonged over that of untreated mice approximately the same number of days that the artificial crisis lasts.

" 2. In mice infected with the passage strain and given a series of increasing doses of immune serum some doses will often produce a crisis while larger doses are not effective. There may be several recurring ' zones of inhibition ' of lytic function within a single series.

" 3. Zonal phenomena are not dependent upon inactivation. They occur with trypanolytic sera arising during the uninfluenced course of infections in guineapigs, rabbits and sheep and in infected mice after treatment.

" 4. Zonal phenomena were observed in neither fresh nor inactivated normal human serum, which is markedly trypanocidal *in vivo*.

" 5. The therapeutic value of immune trypanolytic serum, as measured by length of life of the mice, is dependent upon the occurrence of trypanolysis and not upon the size of the dose. Thus, when trypanolysis is inhibited in a larger dose, length of life is not increased over the control, whereas in smaller doses with trypanolysis, it is increased. Furthermore, the increase in length of life is approximately the same whether the crisis was brought about by a small or a large dose of immune serum."

W. Y.

JAFFÉ (R. H.) & BROWN (S.). **The Influence of Malaria Chills on the Trypanocidal Action of the Serum.**—*Proc. Soc. Experim. Biol. & Med.* 1927. Jan. Vol. 24. No. 4. pp. 344–347. With 1 text fig. [16 refs.]

The malaria treatment of general paralysis afforded an opportunity of studying the effect of malaria chills on the trypanocidal action of the serum. *Trypanosoma equiperdum* obtained from TALIAFERRO was the parasite used and the blood of 5 patients was tested before, during and after the malarial paroxysms. It was found that during the malaria chills the trypanocidal power of the serum was distinctly diminished; the decrease was most pronounced shortly after the temperature had returned to normal, but before the next chill starts the normal titre is restored.

W. Y.

i. WERNER (O.) & HARTMANN (E.). Untersuchungen ueber die trypanociden Serumsubstanzen bei Hämophilie. [**Investigations on the Trypanocidal Serum Substance in Haemophilia.**]—*Med. Klin.* 1926. Nov. 19. Vol. 22. No. 47 (1145). pp. 1803–1804. [5 refs.]

ii. LEICHTENTRITT & OPITZ. Untersuchungen ueber die trypanoziden Serumsubstanzen bei Hämophilie. Bermerkungen zu der gleichnamigen Arbeit von Werner und Hartmann in der M.Kl. 1926, Nr.47, S.1803. **[Remarks on the Work of Werner and Hartmann.]**—*Med. Klin.* 1927. Jan. 14. Vol. 23. No. 2 (1153). pp. 59–60. [2 refs.]

i. After referring to the work of ROSENTHAL and his collaborators (this *Bulletin,* Vol. 22, p. 143, etc.) on the absence or deficiency of the trypanocidal substance from the serum in various conditions associated with grave parenchymatous disease of the liver, and to that of other investigators on similar lines, the authors turn to the observations of OPITZ and ZWEIG. These workers noticed in three cases of haemophilia a disappearance of the trypanocidal substance from the serum and furthermore that a definite parallelism exists between this and the stage of the disease. Whilst in the stage of marked bleeding the trypanocidal action of the serum was normal; when the bleeding had ceased the trypanocidal action was no longer discernible. The observation by these authors that in the mother and sister of these patients also the trypanocidal substance was absent from the serum is very striking. These findings suggest that possibly the liver participates in the mechanism of production of haemophilia. Clinically, however, in haemophilia there is no disturbance of liver function and the investigations of ROSENTHAL have indicated that the trypanocidal power of the serum in adults is only lost in severe parenchymatous disease of the liver.

The authors considered that it would be of great interest to repeat these observations and they did so in four cases of haemophilia. In neither the serum nor plasma of any of these cases did the authors detect a disappearance of the trypanocidal substance, or, in fact, any decrease in its amount. The same applied to the relations of these patients.

ii. This paper is a rejoinder to that of WERNER and HARTMANN. The authors state that the fact that WERNER and HARTMANN found no serological deviation from the normal in four cases of true haemophilia is merely a confirmation of their own communication that exceptions to the rule occur. They themselves have recently encountered a case of sporadic haemophilia in which the serum possessed trypanocidal properties: this was a child with normal red cell count and haemoglobin who for a considerable time had had no marked haemorrhage. WITKOWER had recorded a somewhat similar case in which the serum was trypanocidal after a severe haemorrhage, but unfortunately further examination after blood regeneration had occurred was not made. The stage of the disease seems to be of importance and as WERNER and HARTMANN say nothing about their cases a critical analysis is impossible.

Through the kindness of Professor KLEINSCHMIDT (Hamburg) Leichtentritt has had the opportunity of investigating yet another haemophiliae family. There were 44 examinations made on 30 family members of 6 different bleeder stocks. Seven manifest haemophiliacs possessed no trypanocidal properties in their serum and 1 did, but he was only examined once. Of the 19 non-bleeder relations—male and female—18 lacked the trypanocidal body. The authors consider that the data are now sufficiently large to attribute some significance to the absence of the trypanocidal substances in haemophiliacs.

W. Y.

BEDFORD (G. A. H.). **Report on the Transmission of Nagana in the Ntabanana and Mhlatuze Settlements, Zululand.**—*11th & 12th Reports Director Vet. Education & Res.* Dept. of Agric. Union of S. Africa. Part I. 1926. Sept. pp. 275–300. [2 refs.]

The report is based on a survey of the blood-sucking insects to be found in the western section of the Lower Umfolosi division of Zululand;

the observations were made between October, 1922, and May, 1923. The area in question may be described as that strip of country which extends from the Mhlatuze river on the south to the White Umfolosi river on the north; it lies immediately east of the open highlands of the Melmoth district and west of the equally open sugar-cane belt. The belt is roughly 300 square miles in extent; it comprises about 100 farms, of which a few, less than 20 in the south-east corner, were allotted in 1912 and the remainder in 1918–1920. The settled portion is bounded on the north by a strip of Crown land some 10 miles in depth, which extends along the south bank of the White Mfolosi river. This strip is known as "Shooting Area No. 11," it is one of the extensions of the immense game reserve that lies in the angle formed by the White and Black branches of the Mfolosi.

The greater portion of the new settled area was opened up in 1919–20 to "returned" soldiers who had served in the Great War: prior to this it was practically unoccupied, being sparsely settled by natives only. When the area was thrown open for settlement it was regarded as free from tsetse and nagana—a state of affairs which was somewhat confirmed by the apparent, if not real, absence of nagana amongst the herds of the earlier settlers: this was, however, more apparent than real, because there is now little doubt that sporadic outbreaks did occur, if not at once, at least three years after occupation. With the settlement of the Ntabanana section in 1919, a very serious state of things rapidly developed and since 1920, most of the cattle introduced have succumbed to nagana, and the whole area from Mhlatuze northwards became nagana infected. Notwithstanding the common occurrence of *Glossina pallidipes* in the game reserve and in Shooting Area No. 11 between the Mfolosi and Emseleni rivers the fact that tsetse were not observed further to the south led to the suspicion that the disease was being conveyed by some other blood-sucking insect, possibly a Tabanid or Stomoxys.

In 1922 Sir Arnold THEILER instructed the author to proceed to the Ntabanana settlement in order to clear up the point and ascertain what, in the absence of tsetse, was the agent transmitting the disease. Briefly it may be stated that *G. pallidipes* was found at each point where systematic collecting was undertaken from one end of the settlement to the other. The coastal zone on the east and the high grasslands on the west and south were unsuited to tsetse, but not to Tabanids and Stomoxys; the trypanosomiasis area therefore coincides with the distribution of *G. pallidipes*.

The characteristics of the area surveyed and the method employed in catching flies are described. Referring to the game factors, the author states:—

"There can be no doubt that game has been almost entirely responsible for the distribution of the tsetse fly in the nagana-infected area, and before settlement formed the main, if not the only, food supply for the fly. Since then, however, the country has gradually become more and more populated each year, with the result that the game has in consequence been gradually shot or driven back to the Crown lands and reserve to the north, and as the game has gradually diminished in numbers, so did domestic animals gradually increase and take their place, not only as food for the fly, but also as distributing agents for the pest, enabling it to migrate from unsuitable to suitable localities between the seasons, and acting as reservoirs for the trypanosome.

"In 1920, when game drives in the Ntabanana were instituted there was a hue and cry throughout South Africa that attempts were being made to stamp out the game in that part of the country. Nobody, it is true, desires to kill off all the game in a country, but it must not be forgotten that man and game cannot live together in a fly area. Either one or the other must go, unless man is content to go in entirely for either agriculture or horticulture and to do all his work and transport with mechanical appliances."

Although the distribution of *G. pallidipes* coincides with that of trypanosomiasis there is, the author thinks, much to be said in favour of the view that tsetse alone are not responsible for the general outbreak of disease in the area under discussion. Cases of nagana are out of all proportion to the number of tsetse and it is probable that only a small proportion of tsetse are (*a*) suitable hosts for the trypanosomes, and (*b*) acquire infection through feeding on infected animals. The fact remains, however, that where, e.g., on Farm No. 316, tsetse appeared the more abundant, nagana was the worst and, as a rule, the nearer the game reserve is approached, the more abundant are the tsetse and the more prevalent the disease. Furthermore, Tabanids and Stomoxys are both widespread, whereas the distribution of both nagana and *G. pallidipes* is not only limited, but appears to coincide.

The rest of the paper is concerned with an enumeration of the various blood-sucking insects found in the district.

W. Y.

BLANCHARD (M.), BROUDIN (L.) & BOREL (E.). Surra du chien. Traitement par Bayer 205. Guerison(?). Expériences négatives de transmission de l'affection par *Rhipicephalus sanguineus* Latr. **[Surra in the Dog treated by Bayer 205. Negative Results of Transmission by** *R. sanguineus.*]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 222–225. [4 refs.]

In October, 1926, a dog was brought to the authors from the plateau of Cam-Tiem (Indo-China); it was found to be infected with *T. annamense* and was heavily infested with *Rhipicephalus sanguineus.* Immediately after the presence of trypanosomes was discovered ·5 cgm. of "Bayer 205" was injected subcutaneously. This was followed by a " veritable resurrection " of the animal, but on the fifth day paresis of the hind limbs set in with incoordination of movements; examination of the blood two days later was negative. The nervous troubles subsided and towards the end of December the animal appeared to be in perfect condition. In a footnote it is remarked that on January 13th the animal suddenly became acutely ill with nervous symptoms and was shot by the owner without any examination being made.

The second part of the paper deals with the question whether the infection could be transmitted by ticks. Experiments showed that the trypanosome was rapidly destroyed in the intestine of *Boophilus annulatus* and *Rhipicephalus sanguineus* and that these ticks could not be concerned in the transmission of surra.

W. Y.

CHANNON (Hilda A.) & WRIGHT (Hedley D.). **Observations on Trypanosomiasis of Rabbits and its Natural Mode of Transmission.**—*Jl. Path. & Bact.* 1927. Apr. Vol. 30. No. 2. pp. 253–260. With 1 fig. [15 refs.]

**In this paper the authors describe the morphology and mode of transmission by the flea (*Spilopsyllus cuniculi*) of the rabbit trypano-**

some, *T. nabiasi* Railliet, 1895. They give the following summary of their work :—

" 1. A hutch rabbit was found infected with *Trypanosoma nabiasi.*

" 2. Intravenous inoculations of infected blood into normal rabbits are not always followed by an infection. Infestation of rabbits with infected fleas was found to be a reliable method of transmitting the disease.

" Trypanosomes develop in the posterior station of the flea. The bite of fleas containing the developing trypanosomes is not infective but, if their alimentary canals are eaten by rabbits, infection of the blood stream follows.

" 4. An attack of trypanosomiasis confers an active immunity which lasts at least 6 months.

" 5. It was not found possible to infect rats, mice or guinea-pigs."

W. Y.

NIÑO (Flavio L.). Contribución al estudio de la distribución geográfica del *Triatoma infestans* y de su indice de infección por el *Schizotrypanum Cruzi.* [**The Geographical Distribution of *Triatoma infestans* and the Index of its Infection with *Schizotrypanum cruzi*.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 91–95. With 1 map. [2 refs.]

It is recalled that ROSENBUSCH has established that in certain northern districts the Triatoma are not infected. The author set out to make an index of infection, and like KRAUS and ROSENBUSCH reached the conclusion that there is no relationship between the incidence of infected bugs and that of endemics of goitre and cretinism [see this *Bulletin*, Vol. 23, p. 912].

Starting work in 1919 under the direction of MAZZA, he examined in all 410 vinchucas from various provinces in north Argentine. The results were as follows : Jujuy, 47 examined and 44·86 per cent. infected ; Salta, 134 examined, 61·15 infected ; Tucuman, 117 examined, 76·82 infected ; Santiago del Estero, 47 examined, 26·64 infected ; Córdoba, 11 examined, 100 infected ; San Luis, 12 examined, none infected ; Mendoza, 18 examined, none infected ; San Juan, 2 examined, none infected ; Buenos Aires, 2 examined, none infected.

It appears from this that the infection of *T. infestans* with *Schizotrypanum cruzi* generally speaking increases from north to south, except in the Santiago district, where it is relatively low. The author was told by an engineer on the Rio Negro railway that between San Antonio and Bariloche there were no vinchucas and consequently he was unable to verify the statements of KRAUS and ROSENBUSCH.

The absence of infected bugs in Mendoza and San Luis—both goitrous regions—is against the hypothesis that goitre and cretinism are due to trypanosomiasis. The rarity of cases of human infection and the large percentage of bugs infected suggests that there is another vertebrate host in nature, but what this is the author does not know.

W. Y.

NIÑO (Flavio L.). A propósito de las formas endoglobulares del *Schizotrypanum Cruzi* en la sangre periférica de la lauchita blanca. [**Concerning Endoglobular Forms of *Schizotrypanum cruzi* in the Peripheral Blood of the White Mouse.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 120–122. With 11 coloured figs. on 1 plate. [1 ref.] *

The author, after referring to the fact that most observers refuse to accept the statement of CHAGAS that endoglobular forms of the parasite are seen in the blood of man and experimental animals infected with *Schizotrypanum cruzi*, states that he has seen such forms in fresh and stained preparations of the peripheral blood of a white mouse infected 12 days previously by subcutaneous injections of the intestinal contents, containing numerous flagellates, of a Triatoma.

The intraglobular forms are seen in the red corpuscles and are not flagellates; the invaded red corpuscle is usually enlarged. The flagellated endoglobular forms of Chagas, the author believes to be merely superimposed parasites. The article is illustrated by a coloured plate in which the various forms superimposed and, what the author regards as, true intraglobular forms are depicted.

W. Y.

NIÑO (Flavio L.). Notas sobre anatomia patológica de la esquizotripanosis experimental. [**The Pathological Anatomy of Experimental Schizotrypanosomiasis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. Vol. 2. No. 11. pp. 123–129. With 7 figs. [3 refs.]

There is practically nothing of note in this short article. The author states that *Schizotrypanum cruzi* has a preference for muscular tissue and exhibits a true myotropism comparable to the dermato- and neuro-tropism of the spirochaete of syphilis. *Schizotrypanum cruzi* makes straight for the muscular tissues, especially the cardiac muscles, and there forms nests of parasites.

W. Y.

VILLELA (Enrico) & TORRES (C. Magarinos). [In Portuguese & English.] Estudo histo-pathologico do systema nervoso central em paralysia experimental determinada pelo *Schizotrypanum cruzi*. **Histo-Pathology of the Central Nervous System in Experimental Paralysis caused by** *Schizotrypanum cruzi*.—*Mem. Inst. Oswaldo Cruz.* 1926. Vol. 19. No. 2. In Portuguese pp. 175–198. With 36 figs. on 14 plates (4 coloured) [15 refs.] In English pp. 199–221.

After summarizing the results of previous work on the subject, the authors record their observations on the histo-pathology of the central nervous system made on a series of 39 adult dogs inoculated with a strain of *T. cruzi* isolated from *Tatus novemcinctus* and exalted in virulence by successive animal inoculations. A process of encephalomyelitis resulted, the clinical manifestations of which were paralyses, convulsions, and other nervous disturbances. The infection showed, however, great irregularity in its clinical symptoms and histopathological lesions. As canine distemper also exhibits a paralytic form, great care was taken to exclude this disease.

Encephalo-myelitis in paralytic dogs inoculated with *T. cruzi* is made up of small foci, always found in the vicinity of capillaries and of precapillary vessels, and occurring indifferently in the white and grey matter of the cortex and spinal cord: in the cerebellum the foci are scanty. They consist of macrophages, some of which have evidently migrated from the vessels (endothelial cells) and others, more numerous, probably originated from the neuroglia. The disintegration of the nervous tissue, the formation of many fatty granular cells, their subsequent dispersal and finally cicatricial fibrosis are successive stages in the evolution of the foci. *T. cruzi* (leishmaniform stage) is often found in the cytoplasm of the cells of the foci. The blood vessels show an infiltration of the adventitia and lymphatic sheath by macrophages, lymphocytes and plasma cells. The infiltration is irregular in distribution. In the small arterioles and precapillary vessels inside or near the focus, there is proliferation of the endothelial cells with partial or total obliteration of the lumen of the vessel. Whilst the plasma cells are a constant element of the inflammatory exudate, they never predominate as in sleeping sickness.

Lesions of the nerve cells exist, but are not conspicuous; the Purkinje's cells are most commonly affected and the changes found are swelling of the cell, perinuclear chromatolysis and necrosis. Other cells constantly affected are the large pyramidal cells of the cortex; the multipolar cells of the spinal cord are less often affected. The duramater is normal; the leptomeninges exhibit in places inflammatory changes. The exudate is not abundant and is of a mononuclear nature, consisting of macrophages, lymphocytes and plasma cells. Frequently, the leptomeningitis is of a haemorrhagic type, especially in the cerebellar region: the vessels of the leptomeninges show extensive infiltration by macrophages and plasma cells. The parasite is found within the cells surrounding the vessels. These cells, acting as macrophages, disseminate the trypanosome throughout the nervous system. Evidence is forthcoming suggesting that, in part at least, the return of the trypanosome to the circulation from the foci in the brain is brought about by migration of the neuroglia cells to the outer surface of the blood vessels.

W. Y.

THIROUX (A.). Au sujet de la prophylaxie de la maladie du sommeil. [**Prevention of Sleeping Sickness.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 701–702.

The author asked Dr. VARNEAU to test the value as a Glossina repellant of an essential brownish oil (oil of cajeput) which M. MURAT had extracted in Annam from *Melaleuca viridiflora.* In a letter to the author, VARNEAU wrote that he had anointed two natives with the oil and had set them with two control natives to cut brush wood in a haunt of Glossina. The controls were severely bitten, but the two who had been anointed escaped almost entirely.

W. Y.

YAKIMOFF (W. L.). Deuxième cas d'infection de l'homme par les trypanosomes des animaux. [**Second Case of Infection of Man by Animal Trypanosomes.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. p. 261. [1 ref.]

One of the author's pupils injected subcutaneously into herself a suspension in saline of trypanosomes from the camel, *T. ninae-kohl-yakimov.* A few days later she had a little fever, headache and general malaise. Examination of the blood was negative as was also inoculation of her blood into a guineapig. The symptoms lasted two weeks and then disappeared and she has remained well since during a period of 1½ years.

BRAU. Lutte contre la maladie du sommeil en Afrique Occidentale Française. [**Sleeping Sickness Campaign in French West Africa.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. July–Aug.–Sept. Vol. 24. No. 3. pp. 383–394. [11 refs.]

A general account of the history of sleeping sickness in the French West African Colonies requiring no special notice.

SCHERN (Kurt). Zur Pathogenese der Trypanosomiasen. [**On the Pathogenesis of Trypanosomiasis.**]—*Deut. Med. Woch.* 1927. Jan. 14. Vol. 53. No. 3. pp. 106–107. [3 refs.]

This article is practically a summary of previous papers published by the author and already summarized [this *Bulletin*, Vol. 23, p. 428]. It contains no new observations.

DI DOMIZIO (Giovanni). *Trypanosoma brucei* nella Somalia Italiana. Nota I. Morfologia. Nota II. Tendenza al monoformismo. Raffronti morfologici. Identificazione. [*Trypanosoma brucei* **in Italian Somaliland. I. Morphology. II. Tendency to Monomorphism. Morphological Comparison. Identification.**]—*Nuova Veterinaria.* 1926. Oct. 15 & Nov. 15. Vol. 4. Nos. 10 & 11. pp. 261-271 ; 289-297. With 11 figs. & 4 plates.

The author has made an exhaustive study of the morphology of the polymorphic trypanosome propagated by *G. pallidipes* in Somaliland. He has studied 9 strains of the parasite obtained from 4 mules, 2 horses, a calf, and 2 dogs, and has reached the conclusion that the parasite is *T. brucei.*

W. Y.

## REVIEWS AND NOTICES.

SOUZA (G. H. de Paula). Exposição de motivos sobre o problema da prophylaxia da lepra no estado de São Paulo. Annexo do officio N. 682, de 26 de Dezembro de 1925, da Directoria Geral do Serviço Sanitario, dirigido a S. Excia o Senhor Doutor José Manoel LOBO, Secretario de Estado dos Negocios do Interior de São Paulo. [**Prophylaxis of Leprosy in the State of S. Paulo.**]—115 pp. With 24 plates (2 maps). 1926. " Copag " S. Paulo.

The writer states that according to the most recent census there are about 5,000 undoubted cases of leprosy in the State of São Paulo in a population of 5,000,000. Careful investigations, however, have shown that in addition to these there are a number of more or less latent cases among the patients' family and relations, so that without exaggeration it may be reckoned that there are at least 10,000 lepers in the State.

Little definite is known about the incidence of leprosy in the other states in the Union of Brazil, but all specialists are agreed that the disease is prevalent on a large scale in neighbouring states, especially Minas Geraes. In the north of the country, especially in Para, in which the incidence is highest, and in Maranhao, there is a large number of cases and no state appears to be quite immune.

The author sets forth the following outline of prophylaxis which received the approval of the well-known leprologist D. MARCHOUX:

(1) Notification of cases of leprosy should be made compulsory.

(2) The census of lepers should be drawn up with greater accuracy than hitherto, all the patients being included, so as to give an exact and precise idea of the extent of the disease in the State.

(3) As far as possible domiciliary isolation should be permitted.

(4) Regional leper asylums should be established in the zones of the greatest incidence at the expense of the municipalities.

(5) The children and dependents of lepers should be isolated and protected from contagion.

(6) Present initiative in establishing homes for lepers or their dependents should be allowed and even encouraged.

(7) Courses of instruction in leprosy should be arranged for all persons who desire to attend them and especially for medical men holding an official position, in order to facilitate the diagnosis and treatment of incipient cases in view of the prophylactic and therapeutic benefits to be derived from the early recognition of the disease.

(8) The sanitary education of the patients, members of their family and the population in general should be promoted.

(9) Regional research stations should be established corresponding to the situation of the leper homes in order to compel all the lepers to attend them, especially those in an early stage of the disease.

Although the cost of an anti-leper campaign is considerable, neglect to ensure a proper prophylaxis greatly adds to the difficulty of the problem, owing to the slow but inevitable increase in the number of lepers, who are rendered incurable through proper measures not having been taken.

The author maintains that it would be much more economical to make a large outlay now than to spend an equivalent sum spread over a number of years. The present expenditure in any case is quite inadequate to deal with the problem.

The description of the accommodation for lepers in São Paulo shows that much remains to be done as the existing asylums are inadequate and mediaeval.

An appendix contains a large number of miscellaneous articles, including maps, showing the prevalence of leprosy in the State and town of São Paulo, a paper on the contagiousness of leprosy by Professor BREDA, Dr. MARCHOUX's criticism of the Leper Hospital of S. Angelo, and the author's plans for a leper colony.

J. D. Rolleston.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 8

## BERIBERI.

DE LANGEN (C. D.). **The International Control of Beri-Beri.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 61–85.

The author states that partly decorticated rice is not a satisfactory article for international trade. Polished rice, therefore, which keeps better, is used for food. Rice in the husk, however, can be kept for years and is suitable for transport and storage, but owing to its greater bulk must be more expensive. He recommends it for use in the Dutch Indies. He thinks better use should be made of the bran, which is now given to cattle and pigs; the finest polishings could be used with wheaten flour, but the product is not very palatable and is not likely to be of much practical value.

Very little or nothing can be done internationally in the control of beriberi; local conditions and possibilities are the most important factors.

P. W. Bassett-Smith.

CHUN (J. W. H.) & WU LIEN TEH. **Beri-Beri Control from an Administrative Standpoint.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Toyko, 1925.* Vol. 1. pp. 153–165. [37 refs.]

The author emphasizes the importance of combined legislative and educative measures, and of subsidizing rice mills which will produce proper rice. Taxation of white rice is impracticable. The importance of good hygiene should be taught in addition to careful dieting, as well as the early recognition and treatment of cases.

P. W. B–S.

KATSURADA (F.), IZUMI (M.) & KUBO (K.). **Some Reports of the Institute for Seamen's and Tropical Diseases, Kobe.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1, pp. 819–820.

The authors report that during the past ten years out of 7,552 cases in the Mercantile Marine there were 710 of beriberi, or 9·4 per cent. Since a diet of 70 per cent. rice and 30 per cent. of barley has been enforced with other hygienic measures, there has been a considerable reduction of cases, yet many are still reported. It is noted that pernicious malaria favours the onset of severe beriberi.

P. W. B–S.

SHIMAZONO (J.). **On the Etiology of Beri-Beri.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 37–60.

The author states that there are many changes common to beriberi and avitaminosis. The chief differences are that in beriberi there is cardiac hypertrophy with tachycardia, anorexia, oedema, rise of blood sugar and reduced gastric secretion, whereas in avitaminosis there is no cardiac hypertrophy, but marked emaciation, atrophy of viscera, and hypertrophy of the cortex of the suprarenals.

P. W. B-S.

OMORI (Kenta). **Studies on the Cause and Treatment of Beri-Beri in Japan.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 183–204.

The author particularly draws attention to the high death rate in soldiers and sailors and in infants. The causes are indirect and direct (vitamin B deficiency). Preventive measures are urgently required, as there were 10,000 deaths in 500,000 cases, generally in young people at the most productive period of life. Italian millets and corn are recommended. Improvement in general hygiene is urgent.

P. W. B-S.

SUGIMOTO (K.), YASUDA (Y.), HIGUCHI (M.), MOMOYEDA (S.) & TANAKA (S.). **Studies on Digestibility and Utilization of Rice in Different Methods of Cooking.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 263–268.

SUGIMOTO (K.). **Studies on the Digestibility and Utilization of Rice of Different Grades of Polishing.**—*Ibid.* pp. 269–271.

The various methods of cooking and the different products turned out are described, but are only of local interest. The degree of digestibility depended upon the grade of rice, the caloric value of polished rice being higher than that of unpolished. The percentage of nitrogen in the urine was increased when the subjects consumed polished rice, though the urea nitrogen was less. With unpolished rice the phosphorus in the urine was increased and the total quantity of the faeces was larger. Therefore to obtain a food of similar value more unpolished than polished rice must be consumed.

P. W. B-S.

DEGGELLER (O.). **On the Means of testing Rice with a View on its causing Beriberi.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 87–90. With 9 figs. on 2 plates.

Various methods have been described of determining the characters of rice and their vitamin value. The author stained the grains with an iodine solution which gave varying amounts of blueness in accordance with the extent of decortication and tried to get coloured photograph plates for general use, but these were not permanent. He therefore had coloured prints made which can be used for "controls" and are largely in demand.

P. W. B-S.

TANAKA (Shizuo) & ENDO (Masaharu). Ueber den Stoffumsatz bei Kakke und Geflügerberiberi. **[On the Metabolism in Kakke and Bird Beriberi.]**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 148–151.

The authors summarize the results of their experiments, which show that in kakke and bird beriberi there is a notably increased production of lactic acid and that in bird beriberi the oxygen taken up and $CO_2$ given off is distinctly lower than the normal. It is impossible to say whether this is due to a reduced oxygen supply or to lessened chemical activity of the oxidizable substance. Through the abnormal metabolism in bird beriberi different intermediate products are produced, as is shown by the low respiratory quotient and increase of lactic acid. They consider that the abnormal metabolic changes in kakke and bird beriberi are identical.

P. W. B-S.

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE. **Report of the Sixth Congress of the Far Eastern Association of Tropical Medicine.** 1925. Oct. 11–31. 114 pp. Tokyo, Japan.

This booklet contains the opening and closing addresses, reports of council meetings, and the resolutions passed by the Congress. Of general interest are the statements laid before the Committee on Beriberi Control.

Dr. R. TAKANO, representative of the Japanese Government, pointed out that it is exceedingly difficult in Japan to prohibit the use of polished rice as food or by administrative measures restrict the degree of its refinement. Rice is a more important food for the Japanese than bread for the European, and has been the staple food for ages. Not only is the refining process now carried further than formerly, but the practice of adding other cereals to rice is disappearing. Nevertheless no large number of persons has contracted beriberi. He would rely on educational methods. In any case, the methods of cooking are such that the water-soluble ingredients are largely diminished by washing, and unpolished rice treated in the same way would suffer the same loss. To make any abrupt change in the method of cooking would be difficult. As to the effects of transport and storage, rice in Japan is stored as unpolished rice, but this does not make for the prevention of beriberi, for the customers polish and wash it before it reaches the table. Unpolished foreign rice appears to be unfit for long storage on account of fermentation and damage from insects. He notes that half-polished rice is not so well absorbed in the intestine as refined rice, 94·4 as against 97 per cent.

Dr. LUHN, Chief Health Officer, Sarawak, gave the results of a questionary, but does not state who furnished the replies. He notes that beriberi in Sarawak is mainly found in places where imported Chinese labour is used and is rare among Javanese imported labour as well as in Malays. " Before proceeding to the more severe restrictions it seems desirable to legislate for the better feeding of imported labour, especially Chinese," making vegetable gardens compulsory as well as the addition of oil and a minimum of meat or fish to the ration.

A summary is given of Colonel McCARRISON'S Memoir on the Relation of rice to beriberi in India [see this *Bulletin*, Vol. 22, p. 594]. Though rice-eating races are widely distributed throughout India, beriberi as an endemic in confined to certain well-defined and narrow areas, especially in Madras, and has been so confined for the last hundred years. Strict rice-eating Hindus in these areas suffer less from beriberi than classes of the community who do not restrict themselves to rice. Millet eaters here suffer from beriberi: millet eaters outside do not. Beriberi originates only in those jails which are in the endemic area, though the diet scale in all Madras jails is the same. Madrassi troops furnished 90 per cent. of cases of beriberi in the Native army between the years 1900 and 1920, though they formed no more than one-sixth of its total strength. He notes parboiling is an efficient means of "fixing" vitamin B in the rice grain "for subsequent milling, even when high polishing is resorted to, does not deprive the rice grain of more than one-third of its original content of this vitamin." Chemical investigations in India (NORRIS) have failed to substantiate the claim that the phosphorus pentoxide content of rice can always be regarded as a reliable index of "the beriberi preventing" properties of rice. He believes that there are two factors concerned in the causation of beriberi (*a*) a nutritional or intrinsic; (*b*) an unknown, extrinsic, this unknown factor being peculiar to certain tracts of country or certain places or individuals and to be found either in the gastrointestinal tract of sufferers or in deteriorated food. The control of the disease in India is a matter of education for improvement in the standard of living of the people, housing, sanitation, diet, and storage of rice and other food.

Dr. VERVOORT, speaking for Sumatra, reported that only on the East Coast of Sumatra was imported rice used, and chiefly for the use of large plantations; legal action in rice control is unnecessary.

The Committee on Beriberi Control passed the following resolutions, which were accepted by the Council.

I.

"Whereas beriberi is known to prevail extensively in many countries of the Far East; and

"Whereas there is enormous loss of life, with corresponding invalidism and disability, due to deficient diet; and

"Whereas the deficiency may be corrected by the use of freshly under-milled rice or by the addition of accessory foods; and

"Whereas notwithstanding extensive research work in many countries nothing has been put forward to controvert the disappearance of beriberi when an adequate diet is used; and

"Whereas a suitable test is desirable to determine the presence of sufficient vitamin B and accessory substances in rice; and

"Whereas educational measures to promote the use of adequate diets are highly desirable:

"Therefore be it resolved that this Sixth Congress of the Far Eastern Association of Tropical Medicine considers it urgently desirable that where over-milled rice forms a staple diet steps should be taken to discourage the use of rice from which essential food factors have been removed and that safe storage be provided for under-milled rice and furthermore that the use of accessory foods be encouraged: and

"Therefore be it further resolved that the F.E.A.T.M. considers beriberi a preventable disease and that each country be urged to take vigorous measures to combat its ravages; and

"Therefore be it further resolved that all countries of the East make beriberi a notifiable disease and that arrangements be made for publication of statistics by the Eastern Bureau at Singapore; and

"Therefore be it further resolved that governments encourage research toward developing a practical test for rice that may cause beriberi when used as a staple article of diet.

II.

" Whereas there is no definite understanding as to the classification of rice in its different stages during the process of milling ; and

" Whereas it is believed necessary that studies on beriberi be continued in the different Far Eastern countries :

" Therefore be it resolved to recommend that the Beriberi Committee be continued, and that facts be collected which might be used in classifying rice in its different stages in the process of milling."

A. G. B.

KATO (Toyojiro). [**A Report on the Epidemic of Beriberi Occurring in a School Dormitory. Together with a Notice on the Vitamin Contents of Barley.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News.*). 1926. June. No. 2474. [Summarized in *Japan Med. World.* 1926. Oct. 15. Vol. 6. No. 10. p. 286.]

The author reports on a small epidemic of beriberi in one dormitory of a school in Sendai. The students in this room were all new comers and received a rice to barley ration with the proportion of 6-4, whereas the others had one of 7-3. Those served with the higher barley content contracted the disease more often than those served with the lesser. Experiments with pigeons showed that birds fed on the barley alone soon contracted so-called vitamin deficiency symptoms.

P. W. B–S.

COYNE (A. E.). **Beriberi: its Symptoms and Treatment.**—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 1. pp. 17–19.

There is nothing new with regard to symptoms. The usual food precautions were taken. It is stated, though not demonstrated, that chilli in curry kills the vitamins in the vegetables. The author used marmite both as a prophylactic and for the cure of the disease. Rice-bran tea is easy to supply and is recommended.

P. W. B–S.

MAZZOLANI. Une épidémie de béribéri au Yunnan (Chine). [**An Epidemic of Beriberi in Yunnan.**]—*Rev. Méd. et Hyg. Trop.* 1927. Jan.–Feb. Vol. 19. No. 1. pp. 9–15. [6 refs.]

In Southern Yunnan the country is mountainous and large quantities of rice have to be brought in for the imported Chinese. In 1906–7 beriberi was very prevalent and there was a high mortality—30 to 47 per cent. The cause was traced to deteriorated and fermented rice and the disease was stopped by the substitution of red rice.

P. W. B–S.

TRABAUD. Difficultés du diagnostic différentiel entre le béribéri humide et la bacillose péritonéale à forme ascitique chez les Sénégalais. [**Diagnosis between Wet Beriberi and Ascitic Bacillary Peritonitis in Senegalese.**]—*Rev. Méd. et Hyg. Trop.* 1926. Nov.–Dec. Vol. 18. No. 6. pp. 169–170.

At the hospital St. Jean, Beyrouth, there were among the Senegalese a number of cases of albuminuria with oedema, at first diagnosed as renal. The cause was, however, difficult to determine, since most had pulmonary signs and ascites. The diagnosis rested between peritonitis of bacillary origin and a form of wet beriberi. No evidence of tubercle could be obtained. The ascitic fluid showed numerous red blood cells and flakes of endothelial cells, without lymphocytes or polynuclear cells. Though albumen was present in the urine there were no casts or other evidence of nephritis, so this was ruled out and a diagnosis of beriberi made by a process of exclusion.

P. W. B-S.

BERNARD (P. Noël), PONS, (R.) & LALUNG-BONNAIRE. Les oedèmes dans le béribéri. [**Oedema in Beriberi.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 30–33.

There is much that is of a text-book character in this paper. The chief points emphasized are the toxicity of the poison acting on the nerve cells and the action of fluid in different parts of the body which dilutes down the poison, " a reaction of defence." This is influenced by secondary factors such as intercurrent infections, generally alimentary, or defective hygienic conditions. The retention of chlorides and toxin may explain the pre-paralytic oedemas.

P. W. B-S.

BERNARD (P. Noël), BABLET (J.) & GUILLERM (J.). Le rein et les fonctions rénales dans le béribéri. [**The Kidney and its Functions in Beriberi.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 39–44. With 4 figs. on 2 plates. [1 ref.]

It has been shown that in human beriberi there are changes in the urinary output and also lesions in the renal tubules. There is generally with the oedema a decided increase of chlorides in the blood. The authors argue that the absence of any true inflammatory nephritis strengthens the hypothesis that the disease is due to an infective germ or rather the toxic action of a germ. They state that the renal condition is exactly similar to that caused by the toxin of *B. asthenogenes* in young pigs suffering from the beriberi-like condition.

P. W. B-S.

BERNARD (P. Noël) & BABLET (J.). Le coeur dans le béribéri. [**The Heart in Beriberi.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 127–131.

The authors note that the heart of acute beriberi cases rarely shows any valvular lesions. The enlargement is due to myocardial changes with dilatation of the capillary vessels and lymphatics causing oedema, changes similar to those found in the experimental beriberi of piglets caused by infection with the *B. asthenogenes*. The heart lesions, therefore, of human beriberi have their origin in infectious toxins.

P. W. B-S.

BABLET (J.), GUÉRIN (F.), LALUNG–BONNAIRE & PONS (R.). Examen radioscopique du coeur dans le béribéri. [**Radioscopy of the Heart in Beriberi.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 131–132. With 1 plate.

Radiography shows that the cardiac shadow is at once increased in width and diminished in height, and these changes are exaggerated in the paralytic stage of the disease, when in consequence of failure of the muscles of respiration the diaphragm rises.

P. W. B-S.

PONS (R.) & LALUNG-BONNAIRE. Circulation et respiration dans le béribéri. [**The Circulation and Respiration in Beriberi.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 132–138. With 3 text figs.

This is a study of the circulatory and respiratory systems in cases of beriberi observed in the Pasteur Institute at Saigon. The authors note that tachycardia is always synchronous with the onset of oedema and always precedes the nervous symptoms. In the later stages the tachycardia is increased and is more irregular and is due to cardiac irritability. In the oedematous stage there is increased blood pressure but in the atrophic paralytic stage the tension falls rapidly from the toxin acting upon the nervous system. This alteration of the blood pressure is of great prognostic value. In the heart of beriberics the two chief manifestations are instability and irritability, depending upon vagus and sympathetic involvement.

With regard to the respiratory system the early signs are oedema of the bases; later the intercostals and diaphragm are paralysed, respiration is short, shallow and irregular, with some implication of the accessory muscles. Rarely there is at the time of cardiac crisis an acute pulmonary oedema.

P. W. B-S.

HEINEMANN (H.). Symmetrische Hauterscheinungen bei einem Beri-Beri-Kranken. [**Symmetrical Skin Symptoms in a Beriberi Patient.**]—*Dermat. Ztschr.* 1927. Apr. Vol. 50. No. 2. pp. 135–136. With 1 fig.

The author reports the case of a Chinaman treated in hospital, who had symptoms of beriberi, with paresis of muscles, dilated heart, and oedema, and also an exanthem especially marked upon the front of the hands and wrist, dorsum of feet and lower part of the legs. This was light brownish in colour, rough, scaly, with rounded margins. It was cured when the man was put upon anti-beriberi treatment. The author was not able from his incomplete observations to determine whether this pellagra-like condition was really dependent upon the beriberi, but he reports the case to stimulate further observations. There is a good photograph of the appearance of the feet and legs.

P. W. B-S.

MORIN (H. G. S. ), ADVIER (M.) & MARINOT (J.). Note préliminaire sur les polynévrites observées à l'hôpital indigène de Cholon en janvier-août 1926. [**Cases of Polyneuritis seen at the Native Hospital, Cholon.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 33–38. [1 ref.]

The authors state that there were in eight months at the hospital in Cholon, Cochin-China, 349 cases of beriberi out of a total of 5,296 admissions, that is 6·6 per cent.; 95 per cent. of these are of the dry form. The diagnosis of true beriberi from other forms of peripheral neuritis is often difficult, and there is much slackness in making returns; more care is required in the differentiation of organic nerve disease. The spinal changes as described by H. WRIGHT & GLOGNER are accepted as present and the nerve endings in the muscles are thought to be the physiological elements on which the toxin acts, but of this no proof is brought forward.

P. W. B-S.

VITUG (Wenceslao). **Some Clinical Aspects of Acute Cardiac Beriberi in Adults.**—*Jl. Philippine Islands Med. Assoc.* 1926. Nov. Vol. 6. No. 11. pp. 380–392. With 7 charts. [1 ref.]

The author states that acute beriberi is characterized by a preponderance of cardiac symptoms, and is frequently accompanied by fever which may be intermittent, irregular, remittent or continuous. He gives a number of rules for differentiating the disease from other valvular lesions, all of which can be obtained from ordinary text books.

P. W. B–S.

TSUZUKI (Jinnosuke). **Clinical Experiences in the Antiberiberin Treatment against Beriberi.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 223–225.

Antiberiberin may be given as injections, powders or pills, and has been used since 1911. Over 12,000 cases have been treated since 1913. The symptoms improve in about a week, the disease is shortened, and the mortality reduced. The sequelae may not clear up for six months. In the beriberi of sucklings it has been most successful, 334 cases treated in six years, and all cured. The dose for the babe is the same as that for an adult and the duration of treatment is about 5 days.

P. W. B–S.

SUZUKI (U.).) **Chemical Studies of Vitamin-B in Japan.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 27–35. [24 refs.]

The author describes how he first prepared and used "oryzanin," It has the chemical composition of other vitamin B. preparations, most of which contain sulphur. These amino-acid compounds can be purified, but much further work is required to determine fully their physiological characters.

P. W. B–S.

FUJIMAKI (Y.) & MATSUMURO (H.). **The Vitamin B Content of Rice. New and Old Rice, also Different Grades of Polishing.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 233–237.

The authors found that unpolished rice which had been stored for one year lost about 40 per cent. of its vitamin B. Their experiments were made with pigeons and white rats. Taking the antineuritic vitamin of unpolished rice as 100, then that of 50 per cent. polished was 55 and of 70 per cent. 43. That of white well-polished rice was 25, and of white rice polished with sand paper nil. The vitamin B content diminishes with the period of preservation and with the different grades of polishing, and these run parallel, according to HIGUCHI, with the diminished catalytic action of the enzyme oxidase.

P. W. B–S.

HIGUCHI (Taro). **The Chemical Changes of Rice during Preservation.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 259–262.

The author found that the curve representing the decrease of vitamin B was approximately parallel to the curve of the decrease in catalytic activity. This is of practical utility in determining the value of the rice (see FUJIMAKI and MATSUMURO). The oxidase reaction is used to distinguish old rice from new; the latter becomes purple in colour, the former is not coloured.

P. W. B-S.

HIGUCHI (T.), KONDO (M.), HARA (M.), NARITA (S.) & MATSUZAWA (K.). **Relationships between the Chemical Composition of Rice and the Different Grades of Polishing.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1 pp. 253–258.

This is a paper full of tables of figures to which interested persons must refer. The authors state that there are many good reasons, from both physiological and economic stand-points, for recommending 70 per cent. polished rice. It contains about 0·5–0·8 per cent. of phosphorus (polished rice has 0·4). This view was questioned by HEISER, who stated that age and condition of storage must be taken into account.

P. W. B-S.

TAKAHIRA (Hideo) & KITAGAWA (Sadayoshi). **Respiratory Metabolism after the Ingestion of Rice of Different Grades of Polishing.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 273–277.

This paper follows those on the digestibility and utilization of rice, and in it the authors demonstrate the changes in the respiratory metabolism caused by the use of different grades. They found that the ingestion of rice raised the metabolism and respiratory quotient above the normal, especially when polished rice was used. " The difference of the utilized calories was too small to influence the different specific dynamic actions on metabolism." They conclude that polished rice can be absorbed and utilized more quickly than half-polished or unpolished rice. They think it possible that there may be a greater absorption of carbohydrates from the intestine than that suggested by SUGIMOTO. Unabsorbed carbohydrates may be disintegrated by the intestinal bacteria, which would account for the differences in the respiratory metabolism in different grades of polishing.

W. P. B-S.

VAN BERKHOUT (P. J. Teding). **Microbiological Investigation as to the Extent to which Rice has been polished.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 489–502. [35 refs.]

The importance of discovering a method for the standardization of rice was recognized by the 6th Congress of Far Eastern Association of Tropical Medicine which met in Tokyo in 1925. No method has so far proved to be satisfactory. By means of microbiological methods the author sought to determine how far the growth of yeasts was stimulated by rice extracts, and it was shown that yeast grows more quickly in the presence of bran vitamin-holding extracts than without. These extracts stimulated not only the growth but also fermentation of the yeast, but the increase of fermentation was variable and was not found to be proportionate to the quantity of bran. After much work on these lines the author concludes that there are indications that this method might be useful for estimating the degree of polishing to which rice has been subjected.

P. W. B-S.

SHIMAMURA (Torai) & NAITO (Kan). **Experimental Studies on the Effects of Polished Rice Feeding and its Vitamin-B Defect in the Horse.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress Toyko, 1925.* Vol. 1. pp. 249–252.

Korean ponies were fed on polished rice and boiled rice straw. In from 4 to 12 months there was loss of appetite and body weight, pulse increased in rate and irregular, with paralysis of the hind legs; no rise in temperature nor intestinal symptom. The course was acute. Some of the symptoms coincided with those of human beriberi.

P. W. B-S.

SUGIMOTO (K.), YASUDA (Y.) & KAKEGAWA (S.). **On the Variations of Several Substances in the Different Organs and Blood of Fowls kept on Polished Rice.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 279–282.

The heart, liver, muscles, bone and blood of fowls of about 1,500 gm. weight were examined. Half of those fed upon unpolished rice gained weight. The organs of those fed upon polished rice appeared to lose weight, and in these birds there was a small increase of acetone bodies in the blood. Sugar appeared when symptoms of beriberi were present. Generally in fasting birds glycogen in the liver is a little decreased; when polyneuritis appeared the loss of liver glycogen was great.

P. W. B-S.

SUZUKI (Tadashi). **Studies in the Vitamine B-Content (Rat-Growth-Promoting Water-Soluble B.) in the Mother's Milk of Infants suffering from Infant-Beriberi.**—*Oriental Jl. Dis. Infants.* 1926. Apr.–July. Vol. 1. No. 2 & 3. English summary. pp. 51–72. With 9 charts and 18 figs. on 4 plates. [In Japanese.]

The author gives a very clear and detailed description of his experiment on rats, in which he shows that the milk of beriberi mothers when given in an amount of 2 cc. daily has no power to cure avitaminosis in rats, but that a vitamin extract " oryzanin " immediately cures these cases if the animal is not too far gone. This amount of beriberi milk not only failed to cure the rats, but increased their symptoms. It was, however, evident that the vitamin B was not entirely absent, for if 4 cc. were given the diseased rats often recovered and this quantity was preventive. The experiments incidentally disprove the presence of any toxin in the beriberi milk. The author carefully states that though beriberi milk is deficient in vitamin B, we cannot therefore assert that beriberi is caused by avitaminosis because in beriberi hypertrophy of the heart is always found, whereas it is not so in avitaminosis.

P. W. B-S

SUZUKI (Tadashi). **Studies in the Vitamine-Content (the Yeast Growth-Promoting Stimulus) of Mother's Milk whose Infants are suffering from Infant-Beriberi.**—*Oriental Jl. Dis. Infants.* 1927. Jan. Vol. 2. No. 1. English summary pp. 113–117. [In Japanese.]

Eighteen specimens of milk taken from beriberi cases contained similar yeast growth-promoting stimulus to that found in milk in other acute diseases and certain chronic conditions, but less than that found in Oryzanin. The author therefore concludes that this indicates the amount of the water soluble vitamin B in beriberi milk. He is unable to explain infantile beriberi as a simple avitaminosis.

P. W. B-S.

OKADA (Seizaburo) & SAKURAI (Eiichi). **The Basal Metabolism in Beriberi.**—*Arch. Intern. Med.* 1926. Dec. 15. Vol. 38. No. 6. pp. 770–778. [2 refs.]

Little research has been done upon the basal metabolism of beriberi except by the authors. FLEMING examined one case, but found no essential alteration in the disease.

The authors' conclusions are— (1) In most cases of beriberi quite normal values in basal metabolism and the respiratory quotient were found. (2) With threatened cardiac incompetency an increase was observed. (3) When paralysis and atrophy were very marked a diminution in the basal metabolism was noted.

P. W. B-S.

JANSEN (B. C. P.) & DONATH (W. F.). Over de isoleering van het anti-beriberi vitamine. [**On the Isolation of the Anti-Beriberi-Vitamin.**] —*Geneesk. Tijdschr. v. Nederl. Indië.* 1926. Vol. 66. No. 6. pp. 810–827. With 5 figs. on 2 plates. [20 refs.]

A summary of the preliminary report on this subject has been given (*ante*, p. 126). The various stages of the isolation of the vitamin are given here in detail, which should be consulted in the original by those interested. In a postscript the authors point out that the preparation of the pure vitamin is far too expensive for practical purposes. The comparatively simple structure of the substance, however, is promising in regard to the possibility of its synthetical preparation. In the meantime they propose the therapeutical application of one of the intermediate products (acid clay, activated by the adsorption of the vitamin), which they call " actamin." It is said to be a stable substance, cheap enough for practical purposes.

W. J. Bais.

i. YABE (Sennosuke) & ENDO (Niichiro). [**Experimental Prophylaxis and Therapy of Pigeon's White Rice Disease with the Juice of " Natsumikan " Orange.**]—*Saikingaku Zasshi* (*Jl. of Bact.*) 1926. Feb. No. 360. [Summarized in *Japan Med. World.* 1926. Nov. 15. Vol. 6. No. 11. p. 324.]

ii. ——. [**On my Orange ("Natsumikan ") Cure of Beriberi.**]—*Ibid.* [*Japan Med. World.* p. 324.]

i. The authors report that by giving 16 cc. of fresh orange juice the experimental disease of pigeons was cured and that it also acted as a prophylactic. Heating the juice to 100° C. did not reduce its efficacy.

ii. The authors state that orange juice was useful as a therapeutic agent in beriberi.

P. W. B-S.

**Fujinami** (Akira). Historical Review of Research on Kakke in Japan.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 11–17.

**Hara** (Tetsuichi), **Takada** (Ryohei) & **Matsumuro** (Hideo). On the Utilization of Rice Polishings.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 245–247.

**Irisawa** (Tatsukichi) & **Sakamoto** (Tsuneo). Ueber die Beziehung zwischen B-Avitaminose und Beriberi.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 205–209.

**Jansen** (B. C. P. ) & **Donath** (W. F.). Isolation of Anti-Beriberi-Vitamin.—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1927. Pt. 1. pp. 186–199. With 6 figs. on 3 plates. [Refs. in footnotes.]

**Ogata** (Tomosaburo). Zur Frage nach der Avitaminosentheorie der menschlichen Beriberi.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo,* 1925. Vol. 1. pp. 19–24. [15 refs.]

**Okada** (Seizaburo). Basal Metabolism and Vital Capacity in Beriberi.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 211–212. [2 refs.]

**Plummer** (Beulah A.). The Motility of the Intestinal Tract in Experimental Beriberi (Rats) and Scurvy (Guinea Pigs).—*Amer. Jl. Physiol.* 1927. Apr. 1. Vol. 80. No. 2. pp. 278–287. [11 refs.]

**Shiga** (K.). Prophylaxis of Kakke (Beriberi) and on Kakke of Chosenese.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 213–221.

**Shirabe** (Michitaro). Die Ursache von Beriberi.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 227–231.

**Takahira** (Hideo) & **Ishibashi** (Eiichi). Metabolism of Fowls kept on Normal Food, Fasting, Polished Rice and Vitamin-B Deficient Food.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 239–243.

## UNDULANT FEVER.

HULL (Thomas G.) & BLACK (Luther A.). **Undulant Fever as a Public Health Problem.**—*Jl. Amer. Med. Assoc.* 1927. Feb. 12. Vol. 88. No. 7. pp. 463–464. [10 refs.]

The authors state that the infectivity of *Br. abortus* to man was first proved by KEEFER in 1924 ; since then cases have been reported (1) by EVANS ; (1) by DUNCAN ; (3) by HUDDLESTON, and (7) by CARPENTER. Sixty-nine sera sent to the laboratory for Widal test were tested with *Br. abortus* ; 5 gave agglutination at 1/200, 1 at 1/50, and 5 at 1/25. The fact that many persons have agglutinins in their serum for *Br. abortus* was shown by SEDGWICK in America. EVANS considers 1 in 20 suggestive, the authors 1 in 50. As there are practically no goats in Illinois they can be ruled out ; cattle and hogs would be possible sources, cattle the most probable.

P. W. Bassett-Smith.

LIM (C. E.). **Isolation of** *M. melitensis* **from Patients in China.** (Abstract.)—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 763–764.

The author reports that there is no authentic record in cases of undulant fever in China of the diagnosis having been made by isolation of the specific organism or specific agglutination. He describes an epidemic among Sikh watchmen of a coal mining company at Chiaotso, Honan. These were from the Punjab. In 1924 four cases occurred, recognized clinically and by agglutination (1/400–1/600). The Sikhs kept a small herd of Chinese goats for milk. Was the disease introduced from the Punjab to the goats by " carriers " ? Since the goats were quickly destroyed this cannot be determined. It is stated that a small outbreak followed the arrival of new watchmen from the Punjab. The Micrococcus was obtained from the blood of one. No cases occurred among the Chinese.

The author holds the view that text books are in error when they state that undulant fever is endemic in the Yangtse area, but it must be remembered that an increasing quantity of goat's milk is used by foreigners and " carriers " are possibly present. A survey of the incidence of infection among the native goats is desirable.

P. W. B-S.

RAYNAUD (Lucien). La fièvre ondulante en Algérie. [**Undulant Fever in Algeria.**]—*Bull. Office Internat. d'Hyg. Publique.* 1926. Dec. Vol. 18. No. 12. pp. 1405–1408. With 1 map. [4 refs.]

In 1907 there was a small epidemic of undulant fever at Kleber, Prov. of Oran, which was traced to the local goats ; since that time there had only been sporadic cases until 1926 when the following were noted : January (1) ; March (6) ; April (6) ; May (19) ; and June (30) cases, in all 62 cases increased to 74 by July 9. In the infected region goat's milk is almost exclusively used by a population largely Spanish. Each day from 5 to 6 thousand litres of this milk are drunk or an annual total of two and a half million litres. The municipality of Oran ordered that all milk should be boiled and recommendations with regard to the herds of goats were issued, but there is no power to enforce them. At

Sidi-Chumi, where 4 cases had been noted among the goat herds, 7 per cent. of the milks were infected.

In Algeria there is little evidence of epidemic abortion in the cattle.

P. W. B-S.

ARDIN-DELTEIL. Sur la diminution de fréquence de la fièvre ondulante en Algérie et dans notre sphère d'observation. [**Reduction of Undulant Fever in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Sept. Vol. 4. No. 3. pp. 457–469.

The author shows that since 1895 infection of men and goats with *M. melitensis* has been fairly common in Algeria. In 1911–25 out of 9,606 analyses made in the Pasteur Institute, however, there were only 83 positive reactions, or an average of 5·9 cases per year. The disease has not made any great extension since 1919, being chiefly present in the province of Oran. This is probably due to the fact that in 1908 the importation of Maltese goats was stopped. Details of the cases in the different provinces are given in full.

P. W. B-S.

BÉGUET (M.) & TORSTENSON (H.). La fièvre ondulante dans la région oranaise en 1926. [**Undulant Fever in Oran District in 1926.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Sept. Vol. 4. No. 3. pp. 470–472. [6 refs.]

The authors show that the centres of undulant fever in Oran district are now few, owing to the prophylactic measures taken ; but it is still maintained by infected Spanish goats.

P. W. B-S.

TORSTENSON (Harald). Recherches sur les animaux domestiques porteurs de *M. melitensis*, autres que la chèvre. [**Search for Carriers of *M. melitensis* in Domestic Animals other than the Goat.**]—*Arch. Inst. Pasteur de Tunis.* 1926. Dec. Vol. 15. No. 4. pp. 305–308. [2 refs.]

Many workers have found that various animals are susceptible to infection in the laboratory with *M. melitensis*. The author has carried out researches to see if some of these are infected naturally. He tested dogs, cats, rabbits, fowls, wild rats and guineapigs, all of which were taken from goat stables, houses of goatherds and other places in close association with the goats. The almost consistently negative results tend to show that besides goats (and sheep) there are practically no domestic animals naturally infected with *M. melitensis* in Tunis, but he states that no researches have been made on cattle and pigs.

P. W. B-S.

TORSTENSON (H.). Sérodiagnostic de la fièvre ondulante négatif chez des moutons algériens. [**Algerian Sheep Negative to Serum Test for Undulant Fever.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Sept. Vol. 4. No. 3. p. 473.

The author has tested the blood of 208 Algerian sheep with *M. melitensis*, *M. para-melitensis* and *B. abortus* without finding any evidence of infection.

P. W. B-S.

VIDAL MUNNÉ (José). El aborto epizoótico y sus relaciones con la fiebre de Malta del hombre (Trabajo premiado por la Real Academia de Medicina y Çirugia de Barcelona). [**Contagious Abortion and its Relation to Undulant Fever in Man.**]—*Rev. Hig. y Sanidad Pecuarias.* 1927. Apr. Vol. 17. No. 4. pp. 265–281. [97 refs.]

This article is a review of the relations of *B. abortus* and *M. melitensis,* and thus consists chiefly of a summary of views put forward in the last few years. The author regards milk as a very important vehicle of infection with *B. abortus,* and states that the majority of cases of undulant fever in man where no caprine source can be found may be due to the contaminated milk of cows and, in a later section, that undulant fever is an enzootic which may affect animals and man; thirdly, that there is no valid method at present known of distinguishing the two organisms, the bacillus isolated by haemoculture from man or goats being designated *B. melitensis,* while, if isolated from the cow or other animal, it is called *B. abortus.*

From 90 cases whose sera agglutinated in a titre of over 1 : 200, the highest being 1 : 10,000, he found :—

| | |
|---|---|
| Sera agglutinating in equal titre *B. melitensis* and *B. abortus* ... ... ... ... ... | 41 or 45·5 per cent. |
| Sera agglutinating *B. melitensis* in higher dilution | 11 or 12·2 per cent. |
| Sera agglutinating *B. abortus* in higher dilution ... | 16 or 17·7 per cent. |
| Sera agglutinating *B. melitensis* only ... ... | 11 or 12·2 per cent. |
| Sera agglutinating *B. abortus* only ... ... ... | 11 or 12·2 per cent. |

He also examined the sera of 256 cows killed at the slaughter-house of Barcelona and found 35·15 per cent. which agglutinated " la brucella " [? *B. melitensis*] in a dilution of over 1:200, a close approximation to the figures of STUART (*Trans. Roy. Soc. Trop. Med. & Hyg.* June, 1925), where 31·2 per cent. of 542 sera examined agglutinated the *B. abortus.*

He has repeated the experiments of VERCELLANA & ZANZUCCHI on non-specific agglutination, but thinks that this method is valueless for differentiation of the organisms. [this *Bulletin,* Vol. 23, p. 729; *ante,* p. 112]. A good and fairly comprehensive bibliography is appended.

[It is remarkable that in 24 per cent. of the 90 cases (presumably human) there were present no group reactions, 12 per cent. reacting only to Melitensis and 12 to Abortus; this in itself is a rather important fact and suggests some differential character which should be followed up. Bovine infection with Melitensis from goats has long been known and is not necessarily the same as Abortus infection.—P. W. B-S.].

H. Harold Scott.

EVANS (Alice C.). **Human Infections with Organism of Contagious Abortion of Cattle and Hogs.**—*Jl. Amer. Med. Assoc.* 1927. Feb. 26. Vol. 88. No. 9. pp. 630–632. [14 refs.]

This is largely a résumé of what has already been published, but Miss Evans is more dogmatic than some would think warranted. " The disease in man contracted from cattle and hogs is indistinguishable clinically from that prevalent in the Mediterranean countries and known as Mediterranean or Malta fever." The paper is, however, very valuable and should extend the search for these cases.

She reports 20 described cases of supposed bovine and porcine origin; many are attributed to the consumption of unboiled milk [but often not proved]. The South African cases are referred to, and the increased frequency in Italy, ascribed to cows' milk, as well as a case reported from Palestine and possibly others in the Dutch East Indies.

P. W. B-S.

BAMFORTH (J.). **Two Cases of Undulant Fever occurring in England.**—*Lancet.* 1927. Apr. 16. pp. 818–819. With 2 text figs. [1 ref.]

The author reports two cases of prolonged fever of an undulant type which occurred in patients, one of whom had never been out of England, and one only in France during the war. The former was a woman aged 63 of Essex, the second a man of Kent, aged 40. In both these cases the blood agglutinated *M. melitensis* to 1 in 1,000 and *B. abortus* to 1 in 2,000. No blood culture was obtained. Both patients had drunk cow's milk, but never goat's milk. In the absence of further bacteriological information it is impossible to say whether they were suffering from abortus or melitensis infection, but the author states that the higher agglutination to *B. abortus* points to its being the causative organism.

[It will be noted that both were isolated cases in country districts, which is rather against a milk infection from cows.]

P. W. B-S.

WARREN (C. W.), SMITH (Glen) & LINDNER (Max B.). **Undulant (Malta) Fever, with Report of Two Cases.**—*Clifton Med. Bull.* 1926. Dec. Vol. 12. No. 4. pp. 125–130. With 4 text figs. [7 refs.]

The authors report two cases treated in hospital in New York and thought at first to have been enteric. They were finally considered to have been undulant fever, for the blood of both agglutinated *Br. melitensis* and *Br. abortus* in high dilution ; the blood cultures, however, were all negative. No definite source of infection could be traced, since all milk tested gave negative reactions, and there was no evidence of recent abortion in the cattle of the farm. It must be noted that in both these cases agglutination for typhoid was positive in dilutions of 1/80–1/40.

[There appears to be little justification for the diagnosis "undulant fever cases caused by *Br. abortus.*"]

P. W. B-S.

DUFFIE (H.). **Undulant (Malta) Fever : Two Fatal Cases in Michigan.**—*Jl. Amer. Med. Assoc.* 1926. Nov. 27. Vol. 87. No. 22. pp. 1830–1831.

A farmer of Michigan, with his wife and three children, occupying a house which had been long disused, contracted what they thought was influenza. A boy aged six had high fever, temperature 106°, nephritis and cough, with a high leucocyte count ; he became lethargic and died. The post-mortem showed pleuro-pneumonia.

The father and mother also developed high fever with sweats, delirium and vomiting or diarrhoea. The man had abundant rose spots in successive crops and orchitis. The woman developed temporary glycosuria. Blood cultures and examination of the stools for *B. typhosus* were negative, but the blood agglutinated *B. abortus* to 1 in 40. There were symptoms of pulmonary consolidation and death in a fortnight.

The post-mortem showed no evidence of typhoid ; the spleen in the woman was twice normal size, that of the man was normal.

Dr. HUDDLESTON, of the Michigan State College, diagnosed the cases as *B. abortus* infections. The horses at the time were suffering from distemper.

[The title of this paper is unfortunate and misleading, for though there was a low agglutination reaction with *B. abortus*, the clinical symptoms and the post-mortem signs are not those of undulant fever, as we know them ; whatever the author's opinion may be of the morphological unity of the organisms, to call the cases Malta or undulant fever only serves to perpetuate the present confusion relating to this disease. There were three deaths, not two, if we include that of the boy, and no specific organisms were isolated to corroborate the diagnosis.]

P. W. B-S.

FRISE (W.), SDRODOWSKII (P.) & MINERVIN (S.). Trois cas de contagion de laboratoire causée par le microbe de la fièvre méditerranéenne. [**Three Cases of Laboratory Contagion of Undulant Fever.**]—*Russian Jl. Trop. Med.* 1926. No. 9–10. French summary p. 30. [In Russian pp. 29–30.]

These cases varied in severity from the acute typhoid type to an ambulant form. The diagnosis was confirmed by blood cultures, agglutination and by complemental fixation methods.

P. W. B-S.

MAZZUCCONI (M.). Sulle lesioni determinate dall'infezione sperimentale da " Micrococcus Melitensis " sull'occhio. [**Ocular Lesions caused by Experimental Infection by** *M. melitensis.*]—*Ann. di Med. Nav. e Colon.* 1927. Jan.–Feb. Year 33. Vol. 1. No. 1–2. pp. 14–22. [8 refs.]

MORELLI in 1925–6 recorded the effects of inoculation with two strains of *Brucella melitensis* of the cornea of rabbits after scarification, of injection into the anterior chamber, and into the vitreous. These the author repeated, and confirmed the lesions of the cornea and iris recorded by MORELLI. He found also that similar effects were produced by using material directly from a previously infected rabbit and, thirdly, tested the effects of infected material from animals and a pure culture on the intact conjunctiva. By injection not only were similar lesions produced, but the infective agent acquired an enhanced virulence. Lachrymation and photophobia, followed by purulent conjunctivitis and the development of small punctate granulations occurred. These extended and fused, setting up a widespread keratitis and iritis, and the cornea became opaque. Some 12 days subsequent to inoculation the condition began to clear up, and in a fortnight more, except for residual adhesions of the iris, the animals appeared well. Serum tests gave variable results. In one case, agglutination was positive in a dilution of 1 : 800, in another it was feeble, in a third negative. The organism had no effect on the intact conjunctiva, as MORELLI had previously found. [DE GASPERI, this *Bulletin*, Vol. 23, p. 359, found that there were irregular results with rabbits but plastic iritis was generally caused. The inoculation was of no use for differentiating *B. melitensis* from *abortus*.—P. W. B-S.]

H. Harold Scott.

GIUFFRÈ (M.). Osservazioni sulla vaccinoterapia nella febbre mediterranea. [**Vaccine Therapy in Undulant Fever.**]—*Pediatria.* 1927. Apr. 1. Vol. 35. No. 7. pp. 345–358. With 6 charts in text. [44 refs.]

Nine cases of undulant fever treated by injections of vaccines are described. In some the diagnosis was made by haemoculture, in others by agglutination tests. The effects of the injections were remarkable. In many there was a crisis within a few hours, and in all there was an early amelioration of the general condition. Good results were obtained when the vaccine was administered intramuscularly, but better still when the intravenous route was employed. There was generally a systemic reaction with access of fever, and at times a focal reaction. One case with somewhat anomalous symptoms did not react like the others, and this is regarded as one of mixed typhoid and undulant fever, because the serum agglutinated *B. typhosus* in a dilution of 1 : 100, and *B. melitensis* 1 : 500 ; blood-culture was negative.

[There is no record of doses given in this rather remarkable series of cases and the rapid results would appear to be " Shock " reactions.—P. W. B-S.]

H. Harold Scott.

EVANS (Alice C.). **Studies on** *Brucella* (*Alkaligenes*) *melitensis.*—*U.S. Pub. Health Service. Hygienic Laboratory Bull. No. 143.* 1925. Aug. 67 pp. With 2 charts & 1 plate. 1925. Washington.

This bulletin has five separate parts and a bibliography. Four of these, previously published in the *Public Health Reports* during 1923–24, have been amended and the fifth added under the heading " Hogs as a possible source of human infection." The author divides the strains examined into eight groups, three of which contain only one specimen. The others are : (1) The largest group, mostly of animal origin, var. *abortus*, five human out of 33 ; of these five, four at least were isolated from American cases ; (2) var. *para-abortus*. Human and goat origin, from north Africa and Sicily ; (3) var. *melitensis A.*, mostly human, from Western and Eastern sources ; (4) var. *melitensis B.*, all from Malta and N. Africa, human and caprine ; it is notable that this group is most closely allied morphologically and serologically with the original *M. melitensis* types ; (5) var. *paramelitensis*, all from Malta and Tunis. A plate is given which clearly demonstrates the marked coccus-like character of the three most important types. Many of the strains tested had been long under subculture, which with the variations of animals through which the organism has passed may well give rise to changes in character of the reactions.

Part 5. It is demonstrated that infection can be contracted by handling carcasses of hogs, and that the organism when isolated is more virulent than that from cows. All but one of the cases were from the Western hemisphere, where the infection is on the increase. This, with the fact that cases in France are attributed to handling sheep carcases, renders it necessary to be very much on the alert for the disease in butchers and others who handle the dead animals or their skins (and to notify the same as human abortus infections.)

P. W. B-S.

SANFILIPPO (Emanuele). Sulla immunizzazione antimelitense. [**Immunization against Melitensis Infection.**]—*Biochim. e Terap. Sperim.* 1926. Nov. 30. Vol. 13. No. 11. pp. 426–440. [1 ref.]

By prolonged series of experiments performed with mice and white rats it was demonstrated that the latter are less sensitive to the toxin of *M. melitensis.* Cultures of the organism were killed by heating to 60° C. for 2–4 hours or by contact with chloride of gold.

Injection was made intraperitoneally. The rats survived after as much as 8 such agar-cultures and presented merely temporary loss of weight, but 10 cultures in some rats proved fatal, with rapid loss of weight leading to marked cachexia if death did not occur in the first three or four days. Autopsy revealed hyperaemia of the peritoneum and internal organs, and subpleural petechial haemorrhages.

The vaccine resulted in the production of feeble agglutinating powers in the serum, 1 : 20–1 : 75 only, ten days after inoculation.

In the experiments on immunization, a week after vaccination the animals were inoculated with four times the lethal dose of virulent cocci. If they lived they showed evidence of infection ; if death occurred cultures could be obtained from the spleen, the medulla of the bones, the lymphatic glands and the kidneys, but none from the liver. None of the rats, after vaccination with 4 cc. (i.e. 8 cultures prior to emulsion) of the killed organisms, showed any symptoms worth noting on subsequently receiving 4 lethal doses of the virulent cocci. Comparing the results in white rats with those in mice, it was found that the lower sensitiveness of the former corresponded with the development of a lower degree of immunity.

A second series of experiments was performed, substituting oral administration of the virulent organism for the intraperitoneal route. Two to four agar cultures were given on bread dipped in milk. The results proved to be the same as with the former method.

The author's conclusions may be summed up as follows :—

1. The rat is less sensitive than the mouse to the toxin of the micrococcus, but presents considerable individual variations of sensitiveness.
2. The rat can be actively immunized against undulant fever by intraperitoneal or oral administrations of vaccine.
3. Being less susceptible than the mouse to cultures killed by heat it is not necessary to use organisms killed by chloride of gold, as is needed with the latter.
4. The protection conferred by vaccination with cocci killed by either method is specific, but is of greater degree in mice than in white rats.

H. Harold Scott.

ASCOLI (Maurizio) & SANFILIPPO (E.). **On the Immunization of the Goat against Undulant Fever.**—*Jl. Trop. Med. & Hyg.* 1927. Jan. 15. Vol. 30. No. 2. pp. 19–21. [13 refs.]

Following the work of VINCENT many, not very successful, attempts have been made to immunize goats. Recently the authors have again taken up the subject and have inoculated two goats, one with culture killed by heat, the other with a culture killed and precipitated with gold chloride, which frees it from toxicity. The animals afterwards received by the mouth large doses of a living highly-virulent culture. The results were unexpectedly satisfactory, the animals showed no symptoms and the organism could not be recovered from the goats after death, while the control was heavily infected, the organs giving abundant subcultures. The length of the immunity, however, has not been determined. The gold killed vaccine is said to be better tolerated and to give higher agglutination titre.

P. W. B-S.

GRAZIOSI (A.). Sulla agglutinazione aspecifica con acido lattico per differenziare il bacillo di Bang dal *Micrococco melitense.* [**Non-Specific Agglutination by Lactic Acid as a Means of distinguishing** *M. melitensis* **from** *B. abortus.*]—*Nuovo Veterinaria.* 1926. Nov. 15. Vol. 4. No. 11. pp. 306–309.

After quoting previous reports on the value of this test, the author repeated it with 8 strains of *M. melitensis* and 10 of *B. abortus.* Of the former only two strains were agglutinated by dilutions of 1 : 500 or over, and two were not agglutinated at all. Three only of the ten strains of *B. abortus* were not agglutinated even in very low dilutions. VERCELLANA and ZANZUCCHI had come to the conclusion that *M. melitensis* is always agglutinable by a dilution higher than 1 : 300, while *B. abortus* proved negative.

With this the author's results do not agree, and in his opinion, therefore, the test is quite unsafe as a diagnostic criterion.

H. Harold Scott.

SANGIORGI (Giuseppe). Sulla questione della differenziazione del " B. abortus " dal " M. melitensis " e sul valore per le " Brucelle " del saggio di agglutinazione aspecifica mediante l'ac. lattico. [**The Differentiation of** *B. abortus* **from** *M. melitensis* **by Means of Non-Specific Agglutination with Lactic Acid.**]—*Pathologica.* 1927. Jan. 15. Vol. 19. No. 423. pp. 3–6.

This paper is of interest in presenting a condensed summary of the vexed question as to the identity or otherwise of *M. melitensis* and *B. abortus.* The author first states the claims of the unicist and the dualist, some basing their conclusions on laboratory methods, others on epidemiological, others again on clinical grounds. It is suggested that there may be variations, mutations, and adaptations. Thus, as BASTAI holds, there is a bovine abortion due to *M. melitensis* able also to infect man, besides abortion due to *B. abortus,* non-infective for man. The six laboratory tests are mentioned, namely, the relative thermostability of *B. abortus* as compared with *M. melitensis* (FICAI & ALESSANDRINI) ; the failure of anti-abortus serum to agglutinate an emulsion of *M. melitensis* in bile (DOMINGO) ; the anaphylactic test (POLETTINI) ; the better growth and greater production of alkali in peptone-water media with organic salts (BROWN, DUNCAN & HENRY) ; the differential staining methods of BEZSSONOFF ; and lastly, the non-specific agglutination by lactic acid in dilutions of 1 : 300 and over (VERCELLANA & ZANZUCCHI).

The discordant results recorded of the last are due possibly to different sources of the strains employed. The test should be regarded as valid only when the *B. abortus* used has been isolated from animals and in regions where undulant fever in man is unknown, and, *mutatis mutandis*, with *M. melitensis.*

It is suggested that as there is a *B. paramelitensis*, or strain of *melitensis* non-agglutinable with anti-melitensis serum, so there may be an analogous *B. para-abortus.*

H. Harold Scott.

ENRICO (Cesare). La resistenza al calore delle agglutinine antibang e antimelitense. [**The Thermoresistance of Agglutinins of** *B. abortus* **and** *M. melitensis.*]—*Ann. d'Igiene.* 1926. Dec. Vol. 36. No. 12. pp. 825–841. [40 refs.]

The author, having noted the discordant results reported by those who had made trial of FICAI and ALESSANDRINI'S method of differentiating *B. abortus* from *M. melitensis,* repeated the tests with immune sera obtained by experimental inoculation of various animals, guineapigs, rabbits, sheep, and white rats. Monkeys were also tried, but no agglutinating serum was obtained from these. The results are unfortunately not satisfactory ; either the differences were so slight as to be valueless, as in the cases of guineapigs and rabbits ; or varied in different individuals of the same species, as in the white rats ; or no agglutinins were produced at all, as in the monkeys.

Diversity of reported results, it is suggested, may be due to experimental infection differing from the natural as to the production of agglutinins.

H. Harold Scott.

BÉGUET. Sur les conditions de l'agglutinabilité des microbes et du phénomène de l'agglutination (étude faite sur *Br. melitensis* et *Br. abortus.* [**Conditions of Agglutinability of Microbes:** *Br. melitensis* **and** *Br. abortus.*]—*Ann. Inst. Pasteur.* 1927. Jan. Vol. 41. No. 1. pp. 49–58. [6 refs.]

The author has shown that the phenomenon of agglutination of suspensions of microbes is due to the flocculation of different bacterial substances, part adsorbed upon the bodies of the microbes and part diffused in the liquid. This flocculation depends upon variations in concentration of the substances, the temperature, and the ionization of the liquid of the suspension, and these are governed by the general laws of the stability of colloidal solutions. With regard to *Br. melitensis* there is. (1). A substance flocculable by heat in saline solutions, by acids, and by non-specific serums which can be removed by adsorption with charcoal. This substance appears to be a surface product of the microbe (BURNET). (2). A substance flocculable by salts which is easily demonstrated after the first has been removed. (3). A substance flocculable by specific serum, purely bacterial and specific to the genus *Brucella.* The flocculation of this substance is hindered by a high concentration of the heat flocculable body. This hypothesis reconciles the different hypotheses of PALTAUF, NICOLLE & BORDET.

P. W. B-S.

TAPIA (Manuel) & MARTIN DE NICOLAS (Arturo). Sobre la posible diferenciación ser[illegible] [illegible] s de Bru[illegible] y el *Bacillus abortus* [illegible] [illegible] **ferentiating Serologically** *M. meli*[illegible] [illegible] *Inst. Nac. Higiene de Alfonso XIII.* 1926. Oct. Vol. 4. No. 4. pp. 39–71. [18 refs.]

The first part of this valuable paper briefly reviews and summarizes the work of EVANS, KHALED, and POTELLINI in the different aspects of their investigations. After this very useful summary the authors relate their own experiments. They used sera from human undulant fever patients, the sera of commerce, sera obtained from the horse and the goat, and those prepared experimentally from rabbits, guineapigs, sheep, and man.

Their first group of agglutination experiments was performed with heated sera, the readings being taken after the mixture had been kept at 37° C. for two hours, and then at room-temperature for 24 hours.

These experiments were carried out in different series, using the sera from the various sources named above. The results of each test are given in a number of tables, which save much writing. It is shown that with serum from the horse, goat and sheep, the findings of FICAI and ALESSANDRINI were not confirmed, In the case of the former two, for example, agglutinins, both specific and non-specific, are destroyed by heating to 65° C.

With a second series, employing six human sera, five of these lost the power of agglutinating after being heated to 65° C.; only one retained it.

Again, a guineapig, immunized with *M. melitensis*, was subsequently immunized with *B. abortus*. The only effect noticed was a *lowering* of the agglutinating titre of the serum against both organisms.

All the experiments performed cannot be detailed, the original may be consulted with advantage; the following, however, are the well-considered conclusions drawn by them :—

1. By agglutination only the differences are insufficient to place the organisms of undulant fever and contagious abortion in two species. The authors' results differ from those of EVANS, of KHALED, and of POTELLINI, in each of the conclusions of these authors.

2. Using heated serum gives no more useful data than the simple agglutination. It is true that certain differences do exist in the titre of agglutination, but these differences are no greater between the effects on the two organisisms than between the effects of sera from different animals on the same organisms.

3. Heating by the methods of NEGRE, RAYNAUD, and FINZI does not destroy the agglutinating power.

4. The discordant results recorded by investigators are doubtless due to different strains of organisms employed, both of *M. melitensis* and of *B. abortus*.

A second series of experiments was carried out using saturated and heated sera, but very discordant and irregular results were obtained. These are given, as with the previous tests, in tabular form, and the authors state that owing to the inconstancy of results no reliable deductions can be drawn.

H. Harold Scott.

HUDDLESON (I. Forest), HASLEY (D. E.) & TORREY (J. P.). **Further Stu[illegible] the Isolation and Cultivation of** *Bacterium abortus* **(Ban[illegible]** [illegible] *Infect. Dis.* 19[illegible] 352-368. [27 refs.]

It has been previously reported that the primary isolation of *B. abortus* generally requires definite peculiarities for success, e.g., an increased $CO_2$ content. In this work the method has been very fully developed and it appears that in the growth of the organism three biological reactions may occur.—(1). Production of $CO_2$ which gradually reaches a point which is the optimum for the organism. (2). Production of $H_2S$ from sulphur containing amino-acids. (3). The formation of ammonium magnesium phosphates in alkaline media when ammonia from the amino-acids comes in contact with magnesium phosphates. Incidentally the amount of $H_2S$ given off, detected by lead acetate papers in the tube, is said to be diagnostic between abortus and melitensis. After much work in isolation of the *B. abortus* from various substances and tissues the very important fact is fully demonstrated that for the detection in milk, it is not the centrifuged deposit that is most reliable for culture but the cream, since the cells and bacteria are carried up. Culture of this on special media is more satisfactory than animal experiment, being more practical and rapid. This infection of the cream must have a very important effect on prophylactic measures. The paper is very full of detail and should be read in extenso by those interested in the subject.

P. W. B-S.

BUA (Francesco). Sui rapporti tra melitensis ed abortus. L'intradermoreazione nella melitense con antigene-abortus. [**The Relations between** *B. melitensis* **and** *B. abortus*. **Intradermal Reaction in Melitensis Infection with Abortus-Antigen.**]—*Policlinico.* Sez. Prat. 1927. May 2. Vol. 34. No. 18. pp. 631–635. [21 refs.]

The author used for the intradermal test cultures of the organisms, a loopful emulsified in 2 cc. of normal saline, sterilized by heat and carbolized (0·5 per cent.). He tested the abortus antigen in 5 cases of undulant fever, and 51 of other diseases, tuberculosis, paratyphoid B., pneumonia, malignant disease, etc., and obtained positive results identical with those from *B. melitensis* antigen in the five cases, but negative in the others.

H. Harold Scott.

MESSIERI (A.). Studio sperimentale sull' infezione da germi del genere "Brucella" nella specie canina. [**Experiments on Infection of Dogs by the Brucella Group of Organisms.**]—*Nuova Veterinaria.* 1926. Dec. 15. Vol. 4. No. 12. pp. 317–325. With 2 text figs. [4 refs.]

The dog has for a long time been regarded as resistant to *M. melitensis.* To test the matter three series of experiments were undertaken. Emulsions were made: (1) of the spleen of guineapigs infected with *M. melitensis* obtained from a goat; (2) with the same organism from a human case; and (3) with *B. abortus* recently isolated from a foetal calf.

The conclusions given are these :—

1. Healthy dogs are very resistant to experimental infection with *M. melitensis* and *B. abortus* and large amounts must be used.
2. The time of stay of the organ [illegible] infected dog is relatively short.
3. No pathological di [illegible] the effects produced by the two organisms.
4. Healthy dogs placed in contact with those infected (e.g., pups born of infected mothers) do not contract the disease.
5. Experimental infection did not generally determine abortion except in an advanced stage of the pregnancy.

[Dogs have frequently been known to be naturally infected in Corsica and India.—P. W. B-S.].

H. Harold Scott.

HUDDLESON (I. Forest) & WINTER (O. B.). **Magnesium Ammonium Phosphate Crystals in Aerobic Cultures of** *Brucella abortus* **and** *Brucella melitensis*.—*Jl. Infect. Dis.* 1927. Apr. Vol. 40. No. 4. pp. 476–478. [3 refs.]

The authors have noted the occurrence of magnesium ammonium phosphate crystals in the special liver medium when cultures of *Br. abortus* and *Br. melitensis* are grown aerobically in it. It is now shown that the large size of the crystals is due to their slow formation in a semi-solid medium. The increase in the pH of the medium and the separation of the crystals are due to the formation of ammonia, produced by the activity of the organisms in the culture medium and the formation of the salt interferes with their viability. Old strains of both differ markedly in their ability to cause the formation of the salt ; the strains have to be frequently subcultured to retain their viability when grown aerobically. Similar crystals may be produced in the media artificially in the absence of the organisms.

P. W. B-S.

IZAR (G.) & MASTROJENI (G.). Sulla chemioterapia della infezione melitense. [**Chemotherapy in Melitensis Infection.**]—*Riforma Med.* 1927. Jan. 31. Vol. 43. No. 5. pp. 100–101. [8 refs.]

The authors carried out series of experiments to test the bactericidal action of gonacrine and tripaflavine of the acridine group on *M. melitensis* in vitro. The power of each was about the same. In a dilution of 1 in 125,000 they inhibited growth in a broth culture. It was next found that the addition of normal human serum, in a proportion of one part to four of culture, raised the inhibiting power to more than double ; in fact, no growth occurred with a dilution of 1 : 256,000, but there was growth with 1 : 512,000. It may be inferred that the exaltation would be still greater if immune serum were used in place of normal serum.

Irradiation of the solution for 25 minutes has no effect on its potency. Addition of chrome alum leaves the bactericidal power of the acridine compounds unchanged, but potash alum reduces it to some extent.

H. Harold Scott.

**Burnet (Et.).** Agglutination croisée du *Bact. tularence* et des *Brucella* dans la tularémie et la fièvre méditèrranéenne. [**Cross Agglutination of** *Bact. tularense* **and** *Brucella* **in Tularaemia and Undulant Fever.**]—*Arch. Inst. Pasteur de Tunis.* 1927. Apr. Vol. 16. No [illegible] 90–91.

The author refers to the work of Francis & [illegible] conclusion that it was advisable, on [illegible] test a serum sent to the laboratory for diagnosis of tularaemia for undulant fever also. He takes up the other side of the same subject for sera requiring confirmation in respect of the diagnosis undulant fever. His results were: (1) 12 sera of undulant fever cases, giving with the corresponding organism agglutinations of 1–400 to 1,000, gave no agglutination with *B. tularense* even at 1–20; (2) 3 sera of guineapigs inoculated with *Brucella melitensis*, which agglutinated *melitensis* and *abortus* at 1–1,200, did not agglutinate *B. tularense* at 1–20; (3) 7 typhoid fever sera and 2 of epidemic typhus did not agglutinate *B. tularense* even at 1–20. He concludes that, although the serum of patients suffering from tularaemia is often agglutinating for *Br. melitensis* and *Br. abortus*, this must be non-specific: it is not the case that the sera of patients suffering from undulant fever agglutinate *B. tularense*. Attention must be paid, however, to the very unequal sensitiveness of strains of Brucella to agglutination and particularly to the type *paramelitensis*, which is agglutinated by normal sera and even spontaneously.

W. F. Harvey.

**Andrei** (Giuseppe). Sul valore di alcuno metodi proposti per la differenziazione del " B. melitensis " dal " B. abortus."—*Pathologica.* 1927. Mar. 15. Vol. 19. No. 425. pp. 119–121.

**Zanotti** (Ugo). Un caso di " febbre di Malta " in provincia di Brescia.—*Giorn. di Clin. Med.* Parma. 1926. Dec. 31. Vol. 7. No. 18. pp. 748–751.

## OROYA FEVER AND VERRUGA PERUANA.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. VI. Pathological Changes observed in Animals Experimentally infected with** *Bartonella bacilliformis.* **The Distribution of the Parasites in the Tissues. VII. The Response of the Skin of** *Macacus rhesus* **and Anthropoid Apes to Inoculation with** *Bartonella bacilliformis.*—*Jl. Experim. Med.* 1927. Mar. 1. Vol. 45. No. 3. pp. 437–454. With 27 figs. on 4 plates. [11 refs.]; 455–463. [8 refs.]

vi. "The pathological changes observed in the organs in *Macacus rhesus* monkeys which have succumbed to severe infection with *Bartonella bacilliformis* are similar to those found in human organs in persons dying of Oroya fever.

"The characterisitc changes in the liver are the zonal necrosis of the cells around the hepatic veins, involving active macrophagocytosis of invading polymorphonuclear leucocytes in the necrotic areas, and a marked endothelial hyperplasia in the sinusoids or around the portal veins. In some instances there is fatty infiltration of hepatic cells.

"In the spleen persistent hyperplasia of the endothelial cells of the capillaries leads to the formation of minute foci of infarction, owing to occlusion of the lumina. The follicles are dispersed or reduced, and there is an active macrophagocytosis of cellular débris, polymorphonuclear leucocytes, and erythrocytes. In some specimens an increase in normoblasts is noted. Pigment is sometimes present.

"The lymphatic system shows general progressive endothelial hyperplasia, with active invasion of macrophages which contain polymorphonuclear leucocytes, erythrocytes, and greenish or dark pigments.

"In the bone marrow there is increased activity of macrophagocytes. Numerous normoblasts are found in some instances.

"*In one monkey, sacrificed during the course of infection, small, verruga-like nodules were found in the lungs and spleen.*

"*Bartonella bacilliformis* has been detected miscroscopically, though in small numbers, in all tissues showing histological changes. Parallel cultural determinations of the presence of *Bartonella bacilliformis* in the blood, liver, spleen, lymphatic glands, bone marrow, and local lesions established the relationship between the pathological conditions and the presence of the parasite. The organism seems to persist longest in the lymphatic glands. Cultural methods offer a simple and conclusive means for the determination of the presence or absence of the infecting organism."

vii. This report deals with verruga-like lesions from infection with cultures and growths of *Bartonella bacilliformis.* It is a curious fact that from the lesions of animals experimentally infected, which are generally very chronic, there are rarely any secondary nodules, though the skin around the lesion must frequently be more or less bathed in blood and serum containing the infective organisms. The author asks, why is this? and he endeavours to find out. He shows that the organism does not pass through the intact skin though it infects easily when the skin is scarified or the organism is given intradermally. An ordinary local irritation in an infected animal will not give rise to a verruga nodule at that place; thus they are not due to mechanical factors.

He divides the infection into four stages—Incubation; Initial stage, which is a condition of pure angio-endothelioma; Mature stage, when there is also connective tissue proliferation and occasional penetration of the epidermis into the tissue with evidence of the infecting organism in both stages; lastly a stage of Retrogression.

P. W. Bassett-Smith.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. VIII. Experiments on Cross-Immunity between Oroya Fever and Verruga Peruana.**—*Jl. Experim. Med.* 1927. May 1. Vol. 45. No. 5. pp. 781–786. [6 refs.]

" Nine monkeys (*Macacus rhesus*) and a chimpanzee which had recently recovered from an infection with the Oroya strain of *Bartonella bacilliformis* were tested for immunity against the verruga strain of *Bartonella bacilliformis* as well as against the homologous strain. Complete immunity to both strains was demonstrated. The result establishes the identity of the strains and is in agreement with the result of comparative serological study.

" The criteria of recovery include not only the subsidence of febrile reactions and local lesions but also a negative result of cultural tests of blood and lymphatic gland tissue.

" Recovery may occur as early as 1 month after inoculation, but in most instances a period of 2 to 5 months is required for the completion of convalescence."

P. W. B-S.

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NOGUCHI (Hideyo). **The Etiology of Verruga Peruana.**—*Jl. Experim. Med.* 1927. Jan. 1. Vol. 45. No. 1. pp. 175–189. With 5 charts in text & 3 plates (1 coloured). [6 refs.]

The author first notes the similarity of the epidemiology and some of the clinical symptoms of verruga and Oroya fever, though the former is chronic and the latter acute. Verruga can be directly transmitted, but proof is lacking for Oroya fever. Young rhesus monkeys can be infected with *Bartonella bacilliformis* with the production of signs and symptoms of both diseases.

" A saline suspension of a subcutaneous nodule excised from a verruga patient, and kept in the refrigerator for 14 days, on inoculation into two young *Macacus rhesus* monkeys (Nos. 33 and 34) induced irregular febrile reactions and enlargement of the lymph glands, and in one instance a subcutaneous nodule arose, independently of direct inoculation, on the tail. A microorganism has been isolated from the blood of both animals, and from the experimental nodule, which in pathogenic properties and in cultural and morphological characteristics is indistinguishable from the strain of *Bartonella bacilliformis* isolated from a case of Oroya fever.

" The spontaneous skin lesion of Monkey 34 and the subcutaneous nodules induced by intradermal inoculation of cultures of the microorganism were histologically typical of experimental verruga lesions in monkeys and identical with the skin lesions induced in monkeys by *Bartonella bacilliformis.* The organism, like *Bartonella bacilliformis,* is an intracellular parasite, being found in the cytoplasm of the proliferating endothelial cells of the lesions and in the erythrocytes of the blood.

" The same variations in the manifestations of disease which have been noted in experimental infection with *Bartonella bacilliformis* were observed in the experimental verruga infection. In the second passage (Monkey 41) the infection induced by local inoculation of cultures was severe both locally and constitutionally and was accompanied by marked anemia. The organisms were found in the red cells in large numbers. In the third passage the systemic infection was less severe, but the local lesions were more striking.

" Detection of the parasites in the blood is far more certain by the cultural method than by microscopic examination, the latter procedure being successful only in rather severe infections. The result of blood culture is therefore the decisive method in the final diagnosis of the disease.

" Preliminary serological study shows that the organism isolated in the present instance from the skin lesion of a verruga patient and that previously obtained from the blood of a case of Oroya fever belong to the same serological group.

" The data obtained justify the conclusion that verruga peruana is caused by *Bartonella bacilliformis*. They also definitely establish the fact that the inoculation of blood or sanguineous exudate from lesions of verruga peruana is capable of inducing in susceptible individuals a severe febrile systemic infection, such as that to which Carrion succumbed. The designation ' Carrion's disease ' is therefore the appropriate one for both forms of the infection.

" *Bartonella bacilliformis* may be regarded as a bacterium, since it has the essential features of that group of micro-organisms."

P. W. B-S.

HERCELLES (Oswaldo). Acerca de la " Fiebre Grave de Carrión." **[On Carrion's Disease.]**—*An. Facul. de Med.* Lima. 1926. Vol. 9. Nos. 1, 2 & 3. pp. 94–96.

The author states that he has cultivated in blood-agar with rabbit's testicle the organism of Oroya fever. This can be seen after 24 hours in the form of small bodies with a rotatory movement by the dark-ground illumination, and as small cocci, or encapsulated diplococci, after three days. He mentions in a parenthesis that he treated a patient with a vaccine made from this " with surprising results." [No details are given.]

H. Harold Scott.

## JAPANESE RIVER FEVER.

HAYASHI (Naosuke), OSHIMA (Fukuzo), EGUCHI (Sueo) & HOZUMI (Kanichi). **On Tsutsugamushi Disease and its Virus.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 925–929. With 7 figs. (2 coloured) on 3 plates.

In the Niigata Prefecture, Japan, the Shinano river region is the most infectious area. The case mortality is 40 per cent. Animal experiments with Japanese monkeys, guineapigs and rats were made ; in the former the course was like that in man. Twenty years ago HAYASHI described the Rickettisa-like bodies as the etiological agents.

For protection the use of a proper dress and excision of bite area are recommended. An immune serum may be prepared by passage of the virus through birds, which reduces its virulence. This has been tried on eight children with advantage.

P. W. Bassett-Smith.

NAGAYO (Mataro). **On the Virus of Tsutsugamushi Disease.**—*Far Eastern Assoc. Trop. Med. Trans Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 937–939.

In 1923 intradermal was found to be more efficacious than subcutaneous inoculation of the virus. A monkey (*Macacus fuscatus*) was infected with 3 strains. The skin, lymph glands, spleen and blood were examined. When skin was stained with Azur 2, cells containing round, single, diplococcoid or bacillary bodies stained blue were seen in the corium and were also sometimes found free or in polymorphs. These bodies increase in number with the length of infection. Adjacent lymph glands show proliferation and detachment of the endothelial cells, haemorrhages and necrosis. The condition in the spleen is similar. The author found these bodies also in the mite, especially in the ovum. The virus is non-filterable, non-cultivable, transmitted only by certain mites and is difficult to stain. It is more probably bacterial than protozoal.

P. W. B-S.

## TROPICAL AND ENDEMIC TYPHUS.

NORRIS (V. H.). **A Case of Tropical Typhus Fever in Singapore.**—*Malayan Med. Jl.* 1927. Mar. Vol. 2. No. 1. pp. 44–45.

The author describes the case of a rather prolonged fever in a European which commenced gradually and fell by lysis. It was at first mistaken for enteric, but the laboratory findings disproved this and the Weil-Felix reaction, at a titre of 1 in 400, was suggestive of typhus. During convalescence there was some peripheral neuritis and oedema. Recovery was complete. The intense prostration with loss of knee jerks was considered to clench the diagnosis.

P. W. Bassett-Smith.

BABLET (J.), MESNARD & POLIDORI. Premiers résultats d'une enquête sur le typhus exanthématique au Tonkin. [**Typhus in Tonkin.**]—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 765–770. [3 refs.]

YERSIN & VASSAL in 1908 reported the presence of typhus in South Annam. Since that time only two records of cases can be found, one at Saigon and one in Hanoi. The authors now describe an epidemic in the prison of Hanoi in 1926, 150 cases with 16 deaths. It is pointed out that the foundation of the Pasteur Institute of Hanoi enables the necessary laboratory researches to be carried out for the establishment of the diagnosis, which is often difficult, since in the dark skinned natives the rash is very hard to detect.

P. W. B-S.

MAXCY (Kenneth F.). **An Epidemiological Study of Endemic Typhus (Brill's Disease) in the Southeastern United States, with Special Reference to its Mode of Transmission.**—*Public Health Rep.* 1926. Dec. 24. Vol. 41. No. 52. pp. 2967–2995. With 1 text fig. & 4 maps. [29 refs.]

In 1910 BRILL drew attention to a typhus-like disease of low infectivity and mortality which occurred in the U.S.; this he thought was a new clinical entity. In 1912 ANDERSON & GOLDBERGER found that as in Mexican typhus (Tarbadillo) Rhesus monkeys could be infected by inoculation which rendered them immune to both diseases. They therefore, concluded that Brill's disease was identical with typhus. Some cases could be traced to imported typhus, but many were definitely endemic and sporadic; these, though like Brill's disease, gave a positive Weil-Felix reaction. The present report refers to cases from Alabama and Savannah, Georgia, where imported cases are nil or rare. They include 104 from the former and 93 from the latter, which form a definite clinical group not distinguishable from typhus, though of the Brill type, and thus called endemic typhus.

The epidemiological characters are described, with the seasonal and local distribution. The occupations distinctly suggest that those engaged in trades especially connected with food show an increased risk of infection, but the infection was *not associated with lice.* It was assumed, therefore, that a reservoir exists other than man, and that this reservoir is in rodents from which the disease is occasionally transmitted to man.

P. W. B-S.

## DENGUE AND UNCLASSED FEVERS.

Dive (G. H.). **Dengue in Aden: a Clinical and Statistical Survey, with an Appendix on Fevers in Aden.**—*Jl. Roy. Army Med. Corps.* 1927. Apr. Vol. 48. No. 4. pp. 241–247.

The author has analysed 100 consecutive cases of dengue-like fevers among the troops at Aden, and places them into two groups. (1.) Typical dengue (showing stages of initial fever, remission and terminal fever), 41 cases. (2.) Terminal (not showing these stages), 59 cases divided into; (*a*) a short fever simulating 3 day fever; (*b*) a low continued fever ending in crisis; (*c*) a longer or 5 day fever, ending in lysis; (*d*) cases suggesting a short paratyphoid fever. In none were spirochetes found in the urine, but clinical and epidemiological factors, including the vector, *Aedes argenteus,* make the diagnosis of dengue definite in Aden. This fever occurs generally between April and July, and for fresh non-immunes again in September, when mosquitoes are abundant. The author is doubtful whether sandfly fever ever exists in Aden. He notices a low continued fever invariably associated with polyneuritis which in Aden appears to be a manifestation of beriberi. Enteric and malaria are rare.

P. W. Bassett-Smith.

Richardson (Shaler). **Keratitis as a Complication of Dengue Fever.**—*Southern Med. Jl.* 1927. Jan. Vol. 20. No. 1. pp. 32–36. [73 refs.]

Eye complications in dengue are infrequent and rarely recorded, but the author has seen six cases of keratitis in the first week of convalescence. Two are described in detail. No infecting organisms were found by culture. Herpes of the lids was present in some; the fundus was always normal. It is suggested that the disease is due to a toxic Gasserian ganglionitis. The condition is undoubtedly very rare, since the author states that in the epidemic at Jacksonville he saw only 6 cases of keratitis among 20,000 cases of dengue. Further study whether the infectiousness of the herpetic vesicles is a cause of the trouble is required.

P. W. B-S.

McCallum (F.) & Dwyer (J. P.). Dengue as a Cause of Death. Med. *Jl. Australia.* 1927. Jan. 1. 14th Year. Vol. 1. No. 1 pp. 10–15. [10 refs.]

From a careful study of the statistics in Queensland the author shows that though the mortality of dengue is almost neglible (0·3 per cent.), yet it is not nil, and "in recurrent epidemics there is a tendency to increased severity and fatal cases become more frequent" (Hare). It is necessary that more care in certification should be taken as also in the diagnosis.

P. W. B-S.

Suldey (E. W.). La dengue du Soudan. [**"Dengue" in the Sudan.**]—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 881–884. [2 refs.]

In the author's experience, Soudanese "dengue" may vary in duration from 3 to 8 days, the severity being generally slight. Some cases are of an ambulant type, others attended by considerable fever and marked pains; neither fever nor exanthem are constant signs. He observed a "lethargic" form in a European not before described. He states that the epidemic at Bamako did not cause any deaths, there were no severe complications and relapses were rare. In the differential diagnosis, yellow fever was the most important disease; the detection of albuminuria was significant. It is noted that *Phlebotomus duboisqui* and *P. minutus* were commonly found. It was not possible to state definitely whether the disease was a form of phlebotomus fever or dengue, but he thinks that sand flies were the carriers rather than stegomyia, the prevalence of which did not coincide so well with the incidence of the cases.

P. W. B-S.

Perves. Epidémie de "dengue" à la marine de Dakar. [**Epidemic of "Dengue" in the Naval Forces at Dakar.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 92–99. [5 refs.]

The author states that there was a small epidemic of dengue in a ship at Dakar in 1913. The epidemic now reported occurred between August and October 1926. There were 105 cases among 525 people, with 2 deaths. Men, women, and children were affected. The patients were but a short time in the hospital, and the symptoms were not exceptionally severe, the prognosis being generally good, except for the very old and those greatly debilitated by diseases of the liver and kidney, among whom there were deaths. Stegomyia were abundant as well as other mosquitoes; their destruction was the best prophylactic measure. Blood examinations gave no information.

P. W. B-S.

Lépine (Pierre). Contribution clinique et expérimentale à l'étude de la fièvre de trois jours en Syrie. [**Three Day Fever in Syria: Clinical and Experimental.**]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 251–260. With 1 text fig. [10 refs.]

The research was carried out at the University of Beyrout. Great care was taken to include only typical forms of three-day fever, of which there were 127. The ages of greatest incidence were 19 to 35.

The author states that the virus is present on the first day of fever, that it is in the plasma and is not endoglobular, but BIRT's filterable virus view was not confirmed. The incubation was short—three days and eight hours. The virus was destroyed at 55° C. in 10 minutes; no visible germs were ever found in the blood and no culture was obtained.

The experiments were inconclusive, and will be continued.

P. W. B-S.

YAKIMOFF (W. L.). Un cas de fièvre à cinq jours à Petrograde. [**Five Day Fever in Petrograd.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. pp. 275–280.

The author describes a case of five day fever in a man aged 24. He had been in Odessa, but arrived at Petrograd in 1922. The symptoms were at first like those of malaria, but with peculiar intervals of five days and high spikes (6) associated with pains in the bones. Lice were caught on his body one month before arrival at Petrograd. Spirochaetes were demonstrated from the blood on one occasion only, but did not appear to be *Sp. obermeirii*. Repeated injections of neosalvarsan were curative.

P. W. B-S.

PIROT (R.). Note sur une épidémie de fièvre de sept jours observée sur les navires de guerre stationnés à Saigon (mai-juillet 1926). [**Seven Day Fever on War Ships at Saigon.**]—*Arch. Méd. et Pharm. Nav.* 1926. Oct.–Nov.–Dec. Vol. 116. No. 4. pp. 305–321. [16 refs.]

The author describes a small epidemic of a short fever affecting both those in the ships and the marines on shore, which was apparently carried by stegomyia (*Aedes argenteus*). In none of the cases were spirochetes demonstrated in the blood.

P. W. B-S.

# KALA AZAR.

RAMAN (T. K.). **Kala-Azar in Madras.**—*Madras Med. College Mag.* 1927. Mar. Vol. 6. No. 4. pp. 273–294. With 3 graphs & 6 figs. on 3 plates. [11 refs.]

The paper gives the results of the analysis of 406 cases of kala azar admitted to the General Hospital, Madras, during 1924 and 1925 and certain facts which have come to light regarding the bionomics of *Phlebotomus argentipes* in that city. The racial incidence of the 406 cases gave Europeans 2, Chinese 1, Indians 339, Anglo-Indians 64. The cases varied in age from 3 to 62, the majority being between 10 and 30. The hospital patients showed a preponderance of males, but such preponderance is not borne out by the experience of private practitioners. Of the 406 cases only 115 gave a definite history of onset, which in the majority of these occurred in January, February and March. The distribution of the cases in the city showed that, as stated by KORKE in 1912 (this *Bulletin,* Vol. 2, p. 432) George Town was the cradle of the disease. Of 288 cases 128 came from this part of the city, while 71 were from Vepery, including New Town, and 20 from Triplicane and Mylapore, 16 from Royapuram and 15 from Chintadripet. Outside the city but within Madras Presidency cases came from Kayalpatnam, Tinnevelly Bridge, Dhanushkodi and Calicut. Cases were treated with sodium antimony tartrate or urea stibamine. Of the 406 cases 186 were cured. Of the remaining 220, 50 were known to have died, others went away without treatment or with incomplete treatment. In 4 cases during the course of the treatment herpes developed over the course of one or other of the dorsal nerves. In one case leishmania were found in the liquid from the vesicles.

Under the heading sand flies, information is given regarding the life history of these insects. They could be caught in large numbers during July, August and September. During December and January very few or none could be found, while they were again on the increase during April and up to the hottest season of the year (May to June), when none could be captured. Thus in Madras they are at a minimum during the hottest and coldest seasons of the year.

C. M. Wenyon.

ADAMOPOULOS (Charalambos). Le kala-azar dans le département de Messénie. [**Kala Azar in Messenia, Greece.**]—*Grèce Méd.* 1926. July–Aug. Vol. 28. No. 7–8. p. 26.

From information collected it is evident that kala azar has existed in the department of Messenia at the S. West corner of Greece for many years. It has been known under the name Benokladi and occurs especially in the districts at the base of mountains. Since 1914 the author and Dr. ALIFÉRIS have diagnosed microscopically about 500 cases of the disease. Apart from these the author himself has diagnosed more than 100 cases, while other physicians have identified others. In all from 750 to 800 cases have been microscopically diagnosed in the department during the past ten years. The majority are in children who are at most four years of age. It is of interest to note that during the last five years the area of most intense infection appears to have changed from one district to another. In treatment intravenous injections of tartar emetic, stibyl or stibyal have given very satisfactory results.

C. M. W.

ARTAMONOFF (A. S.). Zur Frage der Verbreitung der innerlichen Leishmaniasis in Samarkand und die Heilung der Krankheit durch die Präparate des Stibiums. **[The Distribution of Kala Azar in Samarkand and its Cure by Antimony Preparations.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Jan. Vol. 31. No. 1. pp. 32–37.

From January 1924 to March 1926 there were registered in the town of Samarkand 138 cases of kala azar of which 71 were Russians. In the old town, with a population of about 65,000, there were 34 cases, while in the Russian quarter, with a population of about 20,000, there were 66 cases. Of the 138 cases 100 occurred in children up to 4 years of age, 26 in those between 5 and 11 years, and the remaining 12 in persons between 12 and 32 years. Of a series of 68 treated cases only 28 recovered, but this bad result was due largely to the fact that the treatment was not continued over a sufficiently long period. There was a definite relationship between the duration of treatment and recovery. Thus, of 9 cases treated for 7 to 10 weeks 5 recovered, while of 21 treated for 6 to 12 months 18 were cured. Various antimony-containing drugs were used but antimony given intravenously was found to be the best.

C. M. W.

HODGSON (E. C.). **Clinical and Pathological Notes on Cases of Kala-Azar.**—*Proc. Assam Branch Brit. Med. Assoc. Annual Meeting, Silchar, 1st and 2nd March, 1926.* pp. 11–16.

The author discusses certain difficulties encountered in the clinical diagnosis of kala azar in Assam. The main features of the disease are splenomegaly, hepatic enlargement, anaemia, pyrexia and leucopenia while the blood gives the aldehyde reaction. With regard to the first four symptoms cases have been seen in which every one of these was absent over fairly long periods, such as a month. The most constant symptom, unless some complicating disease occurs, is leucopenia, the next being anaemia. In these cases one other feature is very constantly present, and that is an increase in the pulse rate to 90 or 110, even when the temperature is normal or subnormal, the rate scarcely rising when the temperature mounts to 102° or 103° F. A failure to recognize this may account for the fact that so many cases, especially those in Europeans, have been treated for enteric fever. More common are the cases showing enlargement of liver and spleen with a normal temperature. These patients as a rule have a history of treatment for malaria or enteric, but usually without disappearance of the enlargement of the spleen and without slowing of the pulse to normal even weeks after the supposed cure. Such are not necessarily errors of diagnosis, for several examples of kala azar with associated malaria infection have been seen and after quinine treatment the temperature has become normal and the general condition improved. Similarly a case of associated enteric fever improved considerably, showed decrease in the volume of the spleen and appeared to be convalescing satisfactorily after having gone through an ordinary attack of enteric fever. The only suspicious signs were a persistent rapid pulse and a leucopenia. So many of the cases of kala azar admitted to the Shillong hospital have some secondary infection that one is led to wonder whether a preliminary breakdown of resistance may not be a necessary antecedent to kala azar.

The commonest diseases complicating kala azar are gingivitis and pyorrhoea, malaria during the fever season, hookworm and worm infections generally, dysenteries, both amoebic and bacillary, jaundice, oedema, resulting from renal insufficiency, and pneumonia. It comes about, therefore, that in Assam, after making a diagnosis of any disease in an Indian, one must always remember that kala azar may be present also. The successful treatment of these diseases is often followed by such definite improvement that the presence of the underlying malady is unsuspected.

Of a considerable number of drugs experimented with three are mentioned—urea stibamine of Bramachari has been a valuable improvement on tartar emetic, but too much has been ascribed to it; Von Heyden 471 (stibosan) was found to act quite as effectively as urea stibamine, while patients showing toxic symptoms with urea stibamine would not necessarily show them with stibosan. Stibamine glucoside (neostam) of Burroughs and Wellcome was quite as effective, if not more so, than the two other drugs in the 23 cases in which it was tried. A decoction of *Vitex pedunculata*, a reputed cure for kala azar, was found to be useless while scale preparations of antimony were not as effective as sodium antimony tartrate.

Three cases are quoted to illustrate definite resistance to antimony treatment. It is pointed out that this resistance is often the outcome of an incomplete initial treatment. Another point emphasized is the increase in the size of the liver which frequently occurs as a result of the use of the newer organic preparations of antimony. Recession takes place when the antimony treatment is stopped. In certain cases no diminution in the size of the spleen occurs even after complete disappearance of parasites. These cases are extremely resistant to any form of treatment, though recently X-ray appears to be giving gratifying results.

In fatal cases of kala azar ascites is present in most, the heart is usually found dilated and flabby with degeneration of the muscle fibres, the pancreas is much enlarged, hard and fibrotic, the mesenteric glands are enlarged in cases dying with chronic diarrhoea, while the kidneys show an acute inflammation and desquamation of the tubule epithelium which leaves a suspicion of antimony poisoning.

C. M. W.

VASILE (B.). Contributo alla conoscenza dell' infezione associata kala-azar-malaria. [**Association of Kala Azar with Malaria.**]—*Pediatria.* 1927. Apr. 1. Vol. 35. No. 7. pp. 376–380. [8 refs.]

Examination of the literature has shown that the association of kala azar with other infections is a comparatively rare condition, only a few cases of concurrent undulant fever and malaria having been recorded. From the histories of 1,132 cases of kala azar seen at the Catania clinic during 1910 to 1925 PARADISO could obtain evidence of malaria in only one. He further observed that in the intense malaria foci cases of kala azar are very rare, while they are encountered with some frequency in non-malarious localities. The author of the present paper, writing from Palermo, describes in detail a case of kala azar in a child 21 months old who suffered at the same time from malaria.

C. M. W.

LOW (George C.) & SAYERS (Edward G.). **The Early Diagnosis of Kala-Azar.**—*Jl. Trop. Med. & Hyg.* 1927. Feb. 15. Vol. 30. No. 4. pp. 46–48. With 1 chart in text.

The difficulty which may occur in the early diagnosis of kala azar is illustrated by the case of an Indian who was admitted to hospital for pneumonia. The patient had not been ill before and though all the tests applied threw no light on the situation it was thought he might be suffering from influenza, though the spleen was enlarged and hard but not tender. The liver also was slightly enlarged. It was then concluded that the illness was due to an atypical form of paratyphoid and suitable diet was instituted. The temperature remained remitting and irregular for 4 weeks. After this a more generous diet was given and the temperature fell to normal, while the general condition improved. Convalescence was uneventful, the temperature remaining normal for 4 weeks, the patient gaining a stone in weight. As the spleen remained in its former condition it was decided to puncture it before permitting the patient to rejoin his ship. The result was that abundant leishmania were discovered and a diagnosis of kala azar established.

C. M. W.

LOW (George C.) & COOKE (W. E.). **A Congenital Case of Kala-Azar.**—*Lancet.* 1926. Dec. 11. pp. 1209–1211. With 3 text figs.

An Englishwoman aged 33 was incompletely treated with urea stibamine for what was thought to be kala azar in Calcutta, after which she returned to England, where she again became seriously ill and was given further injections of the same drug, as a result of which improvement occurred. About 2½ months later a healthy child of normal weight was born. It was not nursed at any time by the mother, who after her confinement began to fail in health again and was admitted to the Hospital for Tropical Diseases, where it was found that she showed all the symptoms of kala azar. As there was no doubt as to the diagnosis treatment with Von Heyden 471 (stibosan) was commenced. After the administration of 4 gm. of the drug she was discharged to all intents and purposes cured.

For the first fortnight after its birth the child progressed normally. It then had a convulsion, was not well for a week and did not completely recover. About 7 weeks later it had bad diarrhoea and pain and was taken into a nursing home. During her period in hospital the mother inquired if it were possible that the child's illness could be kala azar and examination of the child was suggested, and this was done about a month after the mother was discharged. The child did not look well, but as it had no splenic enlargement no puncture was made. During the next 6 months the child was not well, while the abdomen became prominent. It was then brought again for examination. There was marked anaemia, emaciation and protuberant abdomen due to an enormously enlarged spleen. There was high temperature of a remitting type, while the blood count showed R.B.C., 1,600,000; W.B.C., 2,600: Hb. 30 per cent.; poikilocytosis and nucleated red cells were present. A spleen puncture revealed the presence of leishmania. The child was treated with stibosan intramuscularly and made what appeared to be an uninterrupted recovery. About 3 months after the diagnosis of kala azar had been established in the child the mother again became ill. Spleen puncture was then performed and the presence of leishmania confirmed the original diagnosis.

The interesting point about the child is that of a congenital infection. Owing to the mother's illness the child was not nursed by her and was mainly looked after by other people. It does not seem probable that infection took place through contact or orally so that the most reasonable conclusion is that infection took place *in utero*. Against this might be urged that when seen at the age of 7 months there was no enlargement of the spleen and that the illnesses from which the child had suffered were those common in infancy. It was only 6 months later that marked enlargement of the spleen was noted and the diagnosis of kala azar made. It is evident that the increase in size of the spleen took place after the 7th month. The authors are probably correct in their interpretation of the case, but for a final conclusion it would be necessary to find leishmania immediately or soon after birth.

C. M. W.

BHADURI (B. N.). **A Case of Opacities of the Lens occurring as a Sequel to an Attack of Kala-Azar.**—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. p. 144. With 1 diagram in text.

Two months after undergoing a course of treatment for kala azar a young man 22 years of age began to suffer from defect of vision. Examination revealed the fact that there was some opacity of the lenses. It seems possible that the condition was brought about by kala azar. With the improvement in the patient's health further impairment of vision ceased, and when examined a year and a half later he was found to be in the same condition.

C. M. W.

GRAZIANO (Francesco). Nuovo contributo alla terapia del Kala-Azar. [**Treatment of Kala Azar.**]—*Pediatria.* 1927. Apr. 1. Vol. 35. No. 7. pp. 359–364. [62 refs.]

During the ten years 1915 to 1925 116 cases of infantile kala azar came to the notice of the Clinic in Palermo. Of these eight remained in hospital and were successfully treated with tartar emetic, the quantity of drug given to each child varying from 80 to 118 centigrams. The remaining patients either did not enter the hospital or left it shortly after treatment was commenced. Some continued to come for treatment as out-patients, others discontinued treatment or did not even begin it. Of the 108 patients 71 died, 17 recovered and 20 were not traced. Of the recoveries 11 had discontinued treatment, 3 had employed inunctions for periods of two months to two years, 1 was still under treatment and 2 had had no treatment. In view of these figures it is evident that proper treatment with tartar emetic, as claimed by the numerous authors quoted in the paper, will effect a cure in a large percentage of cases. Furthermore it is clear that spontaneous recovery can take place in a small percentage of cases.

C. M. W.

STRUTHERS (Ernest B.). **"Neostam," Stibamine Glucoside, in the Treatment of Kala Azar. (A Preliminary Report.)**—*China Med. Jl.* 1927. Jan. Vol. 41. No. 1. pp. 21–28.

The paper describes the treatment of 18 cases of kala azar with Burroughs Wellcome & Co's neostam (stibamine glucoside, the nitrogen glucoside of sodium p-aminophenyl stibinate). It has a toxicity of about 1/20 of sodium antimonyl tartrate and is used intravenously in a 2 per cent. solution. It is a colourless powder fairly readily soluble in distilled water. Injections are given on alternate days beginning for an adult of 100 lb. weight with a dose of 0.05 gm. and increasing by 0 05 gm. till a maximum of 0·2 gm. is reached. This is continued till the patient has had a total of 2 or 3 gm. A rise in temperature, nausea or headache indicate that the last dose has been too large, in which case the next dose should be reduced by 0·05 or 0·03 gm. The total number of doses required is from 12 to 15 during the course of a month or 5 weeks. Of the 18 patients thus treated 3 died, one a boy of 14, in a hopeless condition when admitted, one a child of 12 with cancrum oris, and one an adult of 36 who developed bronchopneumonia. All the others were cured, with the exception of one in which the result is still in doubt. It is concluded that neostam is much superior to sodium antimony tartrate or tartar emetic for the treatment of kala azar.

C. M. W.

KORCHITZ (E. V.). [**On the Treatment of Infantile Leishmaniasis with Stibenyl.**]—*Pensée Médicale d' Uzbekistane.* Tashkent. 1926. Vol. I. (V.). No. 1. pp. 36–37. [In Russian.]

The author describes an advanced case of kala azar [erroneously referred to as " Orientbeule " in the German summary] in a seven year old boy. Though the patient was in extremis, a definite improvement was observed after seven injections of stibenyl, administered every other day (dose 0·1 gm.). After the thirtieth injection, the patient's health was fully restored. The author strongly recommends stibenyl and quotes the following words of Professor SMORODINTSEV (*Kazan Med. Journ.*, 1926) in support of it : " This preparation sterilizes the organism within ten days in 73 per cent. of cases of kala azar. It should be considered as the best antimony derivative known, both on account of its slight toxicity and the rapidity with which most of it is excreted."

C. A. Hoare.

SANYAL (Charu Chandra.) **Rectal Administration of Antimony for the Treatment of Kala-Azar.**—*Calcutta Med. Jl.* 1927. Feb. Vol. 21. No. 8. pp. 405–408.

The author describes the treatment of 4 cases of kala azar in children by the rectal injection of solution of stiburia (The Union Drug Co. brand of urea stibamine). Response to the treatment was in all 4 cases rapid. Unfortunately the only indication of the dosage used is the statement that in one of the cases treatment was commenced with a dose of 0·05 grams dissolved in 5 cc. of sterile or ordinary pure water. Though the author admits that the cases are published prematurely he feels justified in drawing attention to the method of treatment owing to the difficulty of treating children by intravenous injections.

C. M. W.

AURICCHIO (Luigi). Considerazioni e ricerche sulla terapia della leishmaniosi infantile. **[Treatment of Infantile Leishmaniasis.]**—*Pediatria.* 1927. Mar. 15. Vol. 35. No. 6. pp. 289–300. [8 refs.]

Four cases of kala azar were treated at the clinic in Naples with "eparseno" (aminoarsenophenol). As the drug did not control the disease in any way intravenous injections of tartar emetic were substituted. The latter drug has given consistently good results as evidenced by the 200 cases reported in the paper. Of those which were not lost sight of 165 were cured and 27 died. The mortality was due to bronchopneumonia in 12 instances, acute enterocolitis in 4 and ulcerative stomatitis in 2. In the majority of cured cases the quantity of tartar emetic administered varied from 0·20 to 0·60 grams given during 1 to 3 months. The advantage of treating cases as out-patients so as to avoid hospitalization is emphasized.

C. M. W.

i. GUPTA (B. M. D.). **A Note on the Parasite of "Dermal Leishmanoid".**—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 1. pp. 11–12. [3 refs.]

ii. ——. **Further Observations upon "Dermal Leishmanoid".**—*Ibid*, Apr. No. 4. p. 199.

iii. BRAHMACHARI (Upendra Nath) & DUTT (Anant Mohan). **Chemotherapy of Antimonial Compounds in Kala-Azar Infection. Dermal Leishmanoid with Positive Flagellate Culture from the Peripheral Blood. Part III (New Series).**—*Calcutta Med. Jl.* 1927. Feb. Vol. 21. No. 8. pp. 401–404. With 1 coloured plate.

i. The author notes that the condition known as dermal leishmanoid has now become a commonplace at the School of Tropical Medicine in Calcutta. Every month some 3 or 4 cases are seen. In the great majority the patients have been cured of kala azar some months or, more usually, years before the skin eruption in the form of small leucodermic spots appears. In a few instances no history of previous kala azar can be obtained but all the patients come from kala azar areas. Apart from the skin lesions the general health of the patients is good. Films from the lesions show leishmania but blood culture and spleen puncture, when any enlargement of the organ has permitted the operation, are invariably negative. The question arises as to whether the organism is *Leishmania donovani* or *Leishmania tropica*. A culture obtained from a skin lesion was injected into mice. One of the animals killed 94 days after inoculation was found to have an enormously enlarged spleen but though smears from the organ were negative a culture of leishmania was obtained from it. The parasite of the dermal leishmanoid is thus able to cause a systemic infection in mice.

ii. Returning to the subject of dermal leishmanoid the author points out in the first place that in the early stages there may be difficulty in finding leishmania in smears from the non-pigmented tiny spots on the skin. If, however, a small fragment of tissue be removed and planted into N.N.N. medium a culture usually results. At later stages, when the granulomatous nodules have developed, discovery of leishmania by direct examination is very much easier. In the second place the author records the case of a Hindu lady about 20 years of age who developed the dermal condition and had been suffering from fever for 8 months. The spleen and liver were not palpable and though the aldehyde reaction was negative a culture of leishmania was obtained from the vein blood. The author concludes that the patient was suffering from kala azar and the cutaneous infection. All cases of dermal leishmanoid previously seen have been free from kala azar but the occurrence of the two conditions together opens up the question of the relationship of the organisms in the two diseases.

iii. An account of a case of dermal leishmanoid in which the skin eruption first made its appearance while the patient was on a course of urea stibamine for kala azar, of which he was subsequently cured. The skin eruption, however, proved to be very resistant to treatment, though it diminished on the trunk and extremities after a course of bi-weekly intravenous injections of urea stibamine. In most cases of dermal leishmanoid the skin eruption appears some time after the cure of the kala azar condition has taken place. A coloured plate illustrates the patient's condition.

C. M. W.

i. FOSTER (Percy). **A Note on the Control of Kala-Azar Outbreaks by Means of Therapeutic Measures.**—*Proc. Assam Branch Brit. Med. Assoc. Annual Meeting, Silchar, 1st and 2nd March, 1926.* pp. 17–18.

ii. NAPIER (L. Everard) & FOSTER (Percy). **The Control of Kala-Azar on Tea Estates.**—*Indian Med. Gaz.* 1927. Feb. Vol. 62. No. 2. pp. 76–80. With 2 text figs.

i. With improvement in the treatment and diagnosis of kala azar the question arises, Is it still necessary to evacuate infected lines, as in previous outbreaks, or can reliance be placed on treatment? After considering the question from every point of view with Lt.-Col. CHRISTOPHERS and Major SHORTT it was unanimously concluded that one would no longer be justified in advising evacuation and burning of infected houses and could safely rely on early treatment of all detected cases.

ii. The authors discuss the question of the control of kala azar on tea estates, basing their arguments on the experience gained from two tea gardens. It is concluded that by segregation and treatment of actual cases alone the disease will not be stopped but will be controlled. Treatment alone gives a lesser degree of success, while transfer of the lines may be expected to completely cut short the epidemic. The last remedy, unfortunately, takes time, is expensive and is unpopular with the coolies. From the practical point of view the policy to adopt is to treat each case as it arises and keep a careful look out for suspicious cases. If this is done a considerable degree of success can be anticipated. One of the writers (P.F.) adds a note to the paper giving his experience of the adoption of this method on two gardens where during the years 1923–1925, 23 and 16 families became infected. All cases were treated with urea stibamine with the result that only 6 and 2 further cases have occurred on the two gardens.

C. M. W.

SHORTT (H. E.), BARRAUD (P. J.) & CRAIGHEAD (A. C.). **Transmission Experiments in Indian Kala-Azar with** *Phlebotomus argentipes.*—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 589–600. [3 refs.]

The paper describes in detail a long series of experiments in which 40 mice and 20 hamsters were subjected to 184 bites from a minimum of

152 *Phlebotomus argentipes* known to be infected with *Leishmania donovani.* In no case did an animal become infected. It is concluded that the intensity of exposure to infection was not sufficient to produce infection in these animals and that the results do not invalidate the conclusion that the sandfly transmits kala azar.

C. M. W.

SHORTT (H. E.), CRAIGHEAD (A. C.), CHAND (Khazan) & SWAMINATH (C. S.). **The 'Resistant Non-Flagellate Torpedo and O Bodies' of Row seen in Old Cultures of** *Leishmania donovani* **in their Relationship to the Production of Infections.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 567–576. [5 refs.]

In 1922 (this *Bulletin,* Vol. 20, p. 103) Row published a paper in which he described the reversion in the test tube of the flagellate form of leishmania to rounded forms or O bodies which were similar in nature to the leishmania which occur in the tissues of man. It was presumed that they were resistant forms and that infection of animals from cultural forms of leishmania depended on their presence and that it would probably be found that the same held good for any insect capable of transmitting kala azar and oriental sore. An examination of these claims by direct experiment by the authors has shown that the flagellate forms of *Leishmania donovani* alone are capable of producing infection in white mice when inoculated intraperitoneally. One such inoculation is usually sufficient to produce infection. The O bodies are produced in cultures irrespective of the desiccation of the medium as claimed by Row and much earlier (7th or 8th day) than the minimum of three weeks given by Row. The bodies are most abundant in the richest cultures. They may appear in infected sandflies after a second or subsequent feed. All the evidence available is against the probability of the O body playing any part in producing infections. In infected sandflies the forms which accumulate in the most anterior part of the pharynx and buccal cavity are all flagellated and to admit Row's hypothesis would be to make the assumption that these forms are not infective.

C. M. W.

SHORTT (H. E.) & SWAMINATH (C. S.). **The Mode of Formation and Morphology of the O Bodies of Row in Old Cultures of** *Leishmania donovani.*—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 581–587. With 31 figs. on 1 plate. [9 refs.]

The authors have traced carefully the development of Row's O body in cultures of *Leishmania donovani.* It arises from the short stumpy flagellate forms by a gradual shrinkage and a discarding of the flagellum which breaks off at its point of union with the body. In so doing in the majority of cases it takes with it the intracytoplasmic portion of the axoneme and the parabasal, leaving the nucleus as the only structure in the cytoplasm. By further shrinkage a rounded body measuring 2 microns in diameter is produced. The chromatin mass representing the original nucleus lies near the surface of the body at one point. These O bodies resemble in many respects the minute rounded infective forms which occur in the faeces of certain insects infected with leptomonas such as fleas with *L. ctenocephali,* but in these both the nucleus and kinetoplast are present. The conclusion is reached that the O bodies are the end-products of degeneration of leishmania and are not viable and that it is unnecessary to assume the existence of resistant forms in the life history of *Leishmania donovani.*

C. M. W.

SHORTT (H. E.), BARRAUD (P. J.) & CRAIGHEAD (A. C.). **Note on the Infectivity of the Forms of** *Leishmania donovani* **found in** *Phlebotomus argentipes.*—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 577–579. [1 ref.]

With a view to determining the infectivity of the flagellate forms of leishmania in *Phlebotomus argentipes* a number of mice were inoculated with the flagellates from the alimentary canal of dissected flies. In all 53 mice were inoculated (18 once, 30 twice and 5 thrice). One of the animals became infected. This was a mouse inoculated on three occasions, on each with the flagellates from a sandfly which had its first feed on a kala azar case, its second on a rabbit and its third on a hamster. In the case of the first fly the interval between its dissection and the feed on the kala azar case was 11 days ; in the case of the second and third the interval was 9 days.

C. M. W.

NAPIER (L. Everard) & SMITH (R. O. A.). **The Development of** *Leishmania donovani* **in the Gut of the Sandfly** *Phlebotomus papatasii.*—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 713–716. [5 refs.]

During the kala azar investigations in Calcutta it was found that in the town itself three species of sandfly occurred, viz. *Phlebotomus argentipes, P. minutus* and *P. squamipleuris.* Of the last only very small numbers were found while *P. minutus* does not appear to feed readily on man and none of the specimens caught contained human blood. During 1925 the investigation was extended to villages outside Calcutta and here it was found that large numbers of *P. papatasii* occurred in addition to *P. argentipes.* In the hot dry weather the former was found in most of the living rooms in larger numbers than the latter, which, however, was the predominating form in the cattle sheds. A series of preliminary experiments with a view to obtaining development of *Leishmania donovani* in *P. papatasii* have already been described by NAPIER (1926) in the Annual Report of the Calcutta School of Tropical Medicine for the year 1925. (Report of the Kala-Azar Research Department, p. 21.) It was found that none of 23 *P. papatasii* fed on kala azar cases showed any flagellate infection, though a number of *P. argentipes* fed on the same cases did so. As larger numbers of *P. papatasii* were subsequently caught a larger number of laboratory-bred flies became available so that it was thought advisable to repeat the experiment. In a table the details are set forth. Of 102 *P. argentipes* fed on kala azar cases 43 showed a subsequent flagellate infection while of 101 *P. papatasii* 2 were infected. It is evident that the former is a more suitable host for *L. donovani* and that *P. papatasii,* the distribution of which in India does not correspond with that of kala azar, does not play an important part in the transmission of the disease. It may do so, however, under very favourable conditions.

C. M. W.

PATTON (W. S.) & HINDLE (Edward). **The Development of Chinese Leishmania in** *Phlebotomus Major* **var.** *Chinensis* **and** *P. sergenti* **var.**—*Proc. Roy. Soc.* 1927. May 2. Vol. 101. Ser. B. No. B 710. pp. 369–390. With 5 text figs. [11 refs.]

The authors give an account of the methods employed by them for collecting, handling, feeding, keeping and dissecting sandflies in connexion with their infection by ingestion of blood from cases of kala azar or infected hamsters. The various receptacles and apparatus are depicted and described. The flies are kept in unglazed earthenware vessels filled with admission tubes and covered with bolting cloth. They are fed from small boxes similar to those usually employed for handling lice and are transferred from one receptacle to another by a specially devised pipette fitted with a plunger which can be so manipulated as to blow a fly from the tube as required.

The feeding experiments gave the following results. Of 102 *Phlebotomus major* var. *chinensis* fed on human kala azar cases 5 showed subsequent development of flagellates. Of 157 flies fed on infected hamsters 122 gave a positive result. Of 202 *Phlebotomus sergenti* var. fed on kala azar patients not one revealed any flagellate infection, while of 1,170 of these flies fed on infected hamsters flagellates were observed in 430. The results of these experiments show that the first-named species is a very favourable host for the development of the leishmania of Chinese kala azar. Furthermore the flagellates which develop in this fly readily extend forwards from the mid gut to the pharynx and buccal cavity, whereas in *P. sergenti* the flagellates are limited to the mid gut and as a rule died out in three or four days unless the flies were re-fed. It is evident that *P. sergenti* is a much less favourable host than *P. major* var. *chinensis* for the parasite of kala azar.

C. M. W.

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HINDLE (E.) & PATTON (W. S.). **Sand-Flies and Chinese Kala-Azar.** [Correspondence.]—*Nature.* 1927. Mar. 26. Vol. 119. No. 2995. p. 460.

In this note the authors record the infection of a hamster with leishmania as a result of intraperitoneal injection of the flagellates which had developed in the mid gut of 5 *Phlebotomus sergenti* var. fed three days previously on an infected hamster. It is evident that the flagellates which develop in sand flies from ingested leishmania are capable of giving rise to infections.

C. M. W.

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ARENA (G.). Contributo allo studio della patogenesi della leucopenia nel kala-azar infantile. **[The Pathogeny of Leucopenia in Infantile Kala Azar.]**—*Pediatria.* 1927. May 1. Vol. 35. No. 9. pp. 465–475. With 2 charts in text. [13 refs.]

MAGGIORE and SINDONI claimed that the serum of children suffering from kala azar contains a substance which is leucocytolytic, as evidenced by the diminution of the leucocytes in normal blood when incubated for 2 hours with the serum of kala azar cases. The author of the paper under review has repeated the observation on 7 cases of infantile kala azar and finds that the claims are justified. The presence of the leucocytolytic substance, however, is not constant as in his series the number of leucocytes destroyed per millimetre of blood varied between 1,400 and 0. The brunt of the destruction falls upon the polynuclears.

C. M. W.

CURSON (H. H.). **Does a Species of Leishmania occur in the Goat ?**—*11th & 12th Reports Director Vet. Education & Res.* Dept. of Agric. Union of S. Africa. Part I. 1926. Sept. pp. 29–30. With 1 coloured plate. [2 refs.]

In a blood film made from the ear of a goat which had been used for feeding tsetse flies a group of organisms, illustrated in a coloured plate, and other isolated forms were found. They were regarded as leishmania and the provisional name *Leishmania caprae* was given to the supposed parasite. No further examination of the goat could be made.

[From the coloured plate it appears to the reviewer highly improbable that the organism is a leishmania. The appearance of a group of these organisms in a film of the peripheral blood is most unusual. As it is definitely stated that the distilled water used for staining could not have yielded the organisms it seems most probable that the structures are yeasts and that the blood was contaminated from the skin of the animal. The possibility of their being rounded forms of trypanosomes can hardly be considered as there was no evidence that the goat had any trypanosome infection.]

C. M. W.

BHATTACHARJYA (Subodh Chandra). **An Interesting Case of Kala-Azar.**—*Med. Rev. of Reviews.* Calcutta. 1927. Mar. Vol. 2. No. 3. pp. 124–125.

A case of kala azar in a female patient aged 14 years who was cured by injections of urea stibamine after tartar emetic had failed to control the condition.

BARBACCI (Piero). Un secondo caso di leishmaniosi interna infantile osservato in Siena. [**Second Case of Infantile Leishmaniasis in Sienna.**] —*Policlinico.* Sez. Prat. 1927. May 9. Vol. 34. No. 19. pp. 667–671. With 3 text figs. [1 ref.]

A detailed description of a second case of infantile kala azar from Sienna Italy. (See this *Bulletin,* Vol. 23, p. 587).

BROOKE (R.). **Kala-Azar. Report of a Case.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 27–38.

A case of kala azar in a young man 28 years of age who was admitted to, the Ancon Hospital from a steamer. The infection appears to have been contracted in or near Calcutta, where the patient had lived for 15 years.

PITTALUGA (G.). **Epidemiological Study of Leishmaniasis Visceralis in Spain.**—*Jl. Trop. Med. & Hyg.* 1926. Dec. 1. Vol. 29. No. 23. pp. 387 398. With one map in text. [Numerous refs.]

This paper is an English version of that reviewed in this *Bulletin,* Vol. 23, p. 576. There is one discrepancy between the two. The present version states that many hundreds of cases of infantile kala azar have been observed in Spain since 1925, whereas in the French version the date given is 1912. The latter is undoubtedly correct.

C. M. W.

DOSTROWSKY (A.). **A Study of Cutaneous Leishmaniasis in Palestine.**—*Ann. Trop. Med. & Parasit.* 1926. Dec. 17. Vol. 20. No. 4. pp. 385–406. With 3 plates, 1 text fig. & 1 map.

An investigation of the histories of 28 cases of oriental sore contracted in Palestine proves that the disease is present throughout a large area of the country and that the cases come from localities showing marked variations in geographical and meteorological conditions. Thus, the following places supplied cases of the disease :—Jericho, 820 feet below sea level with a tropical climate, Jerusalem, 2,593 feet above sea level with a temperate climate, and Kantara 150 feet above sea level. In a series of 100 cases, 72 of which had been imported from Persia, Mesopotamia and elsewhere, the sores in a single individual varied from 1 to 158. The clinical picture is that well known from the literature on the subject. The Wassermann test made on a small number of cases showed that in the disease changes occur which give rise to a positive reaction. In 65 per cent. of 74 cases from which information was obtained it might be concluded that the lesions first appeared between September and April immediately before and during the rainy season. The family incidence of the disease is also emphasized and it is noted that 24 of the cases were in 7 families. A discussion of the method of transmission of the disease leads to the conclusion that the distribution of the cases and the lesions can be explained on the hypothesis that sandflies are the carriers. The paper is illustrated by 5 excellent photographs of oriental sore.

C. M. W.

SERGENT (Edm. & Et.), FOLEY (H.) & PARROT (L.). Observations statistiques sur le bouton d'Orient en Algérie. [**Statistical Observations on Oriental Sore in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 20–25. With 1 plate. [2 refs.]

A review of the 112 cases of oriental sore seen at the Pasteur Institute of Algeria, during the period 1915–1925, shows that though the exposed parts of the body as commonly understood are most usually affected, the extent of the actual exposure varies with the habits of the people and their behaviour when in hot climates. The occurrence of sores on the body can be accounted for by the custom of certain individuals of sleeping on hot nights without any covering whatever, so that the whole body is exposed to the bites of sand-flies. The ages of the patients showed that in natives the majority were between 1 and 15 years of age, the age 6 to 10 being the optimum. In the case of Europeans, who moreover were more liable to multiple lesions, all ages were afflicted alike. In 47 Europeans the onset of the disease was during the last five months of the year. In one case, three years after the appearance of a sore on the right arm, two sores developed on the face.

C. M. W.

AGRONICK (M. A.). Beiträge zur Epidemiologie und Kasuistik der Orientbeule. [**Epidemiology and Symptomatology of Oriental Sore.**]—*Dermat. Woch.* 1927. Feb. 19. Vol. 84. No. 8. pp. 261–273. With 3 text figs. [46 refs.]

The paper discusses the subject of oriental sore which is very common in Turkestan and Transcaspia. Four cases are described with a view to illustrating the family incidence of the disease and the possible involvement of the mucosae, the latter condition being seen in two of the cases which showed involvement of the mucosa of the lips without any ulceration of the neighbouring skin from which extension could have taken place. In both cases there were sores on the skin on other parts of the body.

C. M. W.

BURGA (Buenaventura). Distribución geográfica de las leishmaniasis en el Departamento de Amazonas. [**Distribution of Leishmaniasis in Amazonas, Peru.**]—*Cronica Med.* Lima. 1926. June. Vol. 43. No. 756. pp. 169–174. With 3 text figs.

As regards the distribution of uta in Uctubamba the district is divisible into 3 zones. The first is 2,800 metres above sea level, is cold and is free from the disease ; the second, 2,000 metres above the sea, has a temperate climate and here uta is found; while the third with an altitude of 1,000 metres is hot and is characterized by its malaria and ankylostomiasis. A case of the disease in a man 25 years of age is described. There was extensive involvement of the naso-pharyngeal and buccal mucosae and of both feet, the terminal part of one of which was reduced to a granulomatous mass. Treatment with tartar emetic was instituted and though the patient would not continue the course the considerable improvement which took place justified the diagnosis of leishmaniasis.

C. M. W.

MAZZA (Salvador). Leishmaniosis tegumentaria y visceral. [**Dermal and Visceral Leishmaniasis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 13. pp. 209–216. With 27 figs.

The article is a general discussion of the subject of cutaneous leishmaniasis in the Argentine and its relationship to the similar disease in dogs and the distribution of sand flies. It is illustrated by a series of photographs showing the parasites from the sore and their cultural forms, several cases of the lesions in human beings and dogs, and sand flies. It is evident the disease is widely distributed. It is of interest to note that in one particular house in which sand flies (*Phlebotomus verrucarum ?*) were captured there occurred five cases of the disease in man and what was undoubtedly one in a dog, though unfortunately the animal was destroyed before a microscopic examination had been made.

C. M. W.

ARIAS ARANDA (Carlos). Un caso autóctono de leishmaniosis cutánea en la ciudad de Salta. [**Indigenous Case of Dermal Leishmaniasis in the City of Salta.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 322–326. With 2 text figs. Also in *Semana Méd.* 1927. Jan. 13. Vol. 34. No. 2 (1722). pp. 94–96. With 2 text figs.

The paper describes a case of cutaneous leishmaniasis, the first autochtonous case to be recorded from Salta in the Argentine. The history of the case is of interest as the patient, a woman 30 years of age, gave a definite history of having been bitten on the arm by an insect which she described as being much smaller than a mosquito. The mark of the bite rapidly developed into a lesion which did not respond to simple treatment. It was 3 centimetres in diameter by the 6th day. It increased in size and was associated with pains in the finger joints and axillary glands. Finally leishmania were found in scrapings from the sore about one month after the bite. Intramuscular injections of Spirby's mixture, the chief constituent of which was double iodide of bismuth and quinine, were given on 14 occasions during the next eight weeks, with the result that complete healing took place.

C. M. W.

BERNASCONI (Vicente E.) & PATERSON (Guillermo C.). Observaciones ilustrativas de las formas de espundia en el norte de la República. [**Muco-Cutaneous Leishmaniasis (Espundia) in the Northern Parts of Buenos Aires.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 327–347. With 36 figs.

This brief paper is illustrated by 36 photographs, which give excellent representations of the condition. The chief points of interest are that in many cases there is seen a primary lesion of the skin where an insect has implanted the virus. This heals spontaneously, the mucocutaneous lesions being of the nature of a secondary stage to this "espundial chancre," which is probably present in all cases, but may be quite small and masked by the later destructive changes. Affections of the palate and pharynx are metastatic since these sites are inaccessible to the bites of insects. The author states in support of this that in no case where the primary lesion has been treated with tartar emetic has espundia followed.

H. Harold Scott.

ADLER (S.). **A Note on the Histopathology of a Case of Experimental Cutaneous Leishmaniasis.**—*Ann. Trop. Med. & Parasit.* 1926. Dec. 17. Vol. 20. No. 4. pp. 407–410. With 1 plate.

As a result of inoculation of an individual with the naturally occurring flagellates of *Phlebotomus papatasii* by scarification of the skin there developed a hard subcutaneous nodule from which leishmania were obtained by puncture. As this lesion differed from the cutaneous ones usually seen in oriental sore a portion of the nodule together with the overlying skin was removed for histological study. The nodule was found to be 4·5 mm. in diameter in cross section while the outer surface of the epidermis was 2·5 mm. distant from the nearest point in the nodule. The lesion itself was not encapsuled and consisted of a conglomeration of tubercles separated from each other by strands of connective tissue infiltrated with lymphocytes, plasma cells and endothelial cells. The tubercles were of varying stages of development, some showing advanced fibrosis and several caseation. Giant cells were a marked feature of the lesion. It is interesting to note that though the inoculation was performed by scarification the epidermis was normal, the flagellates having reached 4·5 mm. below the surface of the epidermis to give rise to the nodule. The corium did show scattered areas of infiltration consisting mainly of fibroblasts with some small round cells and plasma cells, but an absence of endothelial and giant cells. It is concluded that these changes in the corium must have been caused by the trauma incidental to the frequent examinations of the lesion.

C. M. W.

SCANLON (R. W.). **A Case of Naso-Pharyngeal Leishmaniasis.**—*Somaliland Protectorate Ann. Med. & San. Rep. for Year ending 31st December, 1925.* pp. 35–36.

The patient, who had suffered from the disease for 3 years, showed a swelling of the alae nasi and the right cheek. It was found that the nasal septum had necrosed as far as the bony parts and the turbinates had disappeared, leaving one huge cavity covered with granulation tissue. A granular mass occluded the posterior nares while the posterior wall of the pharynx was covered with a friable and vascular adenoid growth. There was enlargement of the sub-maxillary glands. Scrapings from the ulcerated margins showed scanty but typical leishmania. Under treatment with intravenous tartar emetic and Von Heyden 471 and local applications the patient was cured. The author states that he has seen 4 other such cases, 2 of which, as far as he is aware, had never left the protectorate, but it was only in the case described that leishmania were found.

C. M. W.

DE REZENDE (Mario Ottoni). Cura da leishmaniose das mucosas. Casuistica. [**Treatment of Leishmaniasis of the Mucous Membranes.**]—*Bol. Soc. Med. e Cirurg. de S. Paulo.* Brazil. 1925. Mar., Apr., May & June. Ser. 3a. Vol. 8. Nos. 1, 2, 3 & 4. pp. 76–81.

The author recalls the fact that in 1923 he placed on record a form of treatment of muco-cutaneous leishmaniasis by lactic acid, illustrated by two cases.

Another 18 cases are now detailed. The principle of the treatment is as follows: Under anaesthesia the affected site is thoroughly curetted and an 80 per cent. solution of lactic acid is applied. This is repeated weekly and in most a second and even a third curettage is carried out at intervals of not less than three weeks. Cure resulted in several cases in a month, and in most within 3–4 months.

In some patients lactic acid was injected intravenously, 2 cc. of a 1 per cent. solution at first, later a 2 per cent. solution. Originally this was administered every two days, but every 8 or even 10 days was found preferable. Headache, dyspnoea, and pain in the chest were indications for suspending the treatment, and the local application of the strong solution, 80 per cent., has given much better results.

H. Harold Scott.

VARMA (R. L.). **Berberine Sulphate in Oriental Sore.**—*Indian Med. Gaz.* 1927. Feb. Vol. 62. No. 2. pp. 84–85.

The author, having heard that local applications of rasout—a dry extract of *Berberis indica*—were of benefit in oriental sore, tested the action of berberine sulphate [0·25 gr.—? gram or grain] in 1 cc. distilled water injected into the sore by means of a hypodermic syringe. In the first case this treatment produced local reaction in the form of congestion and oedema, but associated with little pain or tenderness. A week later the sore was again infiltrated with the solution. The patient was entirely cured and did not require a third injection. The method of treatment has since been followed in many cases so that the author is led to believe that berberine is as specific for oriental sore as quinine for malaria.

C. M. W.

ADLER (S.) & THEODOR (O.). **The Identity of** *Leishmania tropica* **Wright, 1903, and** *Herpetomonas papatasii* **Adler, 1925.**—*Ann. Trop. Med. & Parasit.* 1926. Dec. 17. Vol. 20. No. 4. pp. 355–364. With 2 plates. [19 refs.]

The authors have previously reported that they were able to produce lesions in three persons by the inoculation of the naturally occurring flagellates of *Phlebotomus papatasii.* The parasites in the lesions appeared to be identical with *Leishmania tropica* and there was reason to suppose that the disease produced was actually oriental sore. Nevertheless, since various authors had claimed to have infected vertebrates with insect flagellates which could not possibly be *Leishmania tropica,* it seemed advisable to test the serological relationship of the flagellates cultured from the experimental lesions to those obtained from naturally occurring oriental sore by the method devised by NOGUCHI. The culture medium employed was agar, 1 part, Locke's solution containing 0·2 per cent. of dextrose, 8 parts, and fresh rabbits' serum, 1 part. If the medium be made with serum from an immunized rabbit or if immune serum be added to a culture already commenced, instead of growing in a uniform layer at the top the organisms grow in clumps for a varying distance throughout the medium. Rabbits were immunized with the flagellates grown from the three experimental cases and with those from three cases of oriental sore and their sera tested against the cultures by the above method. The cultures were also tested by KLIGLER'S method which consists in mixing one part of culture with six parts of saline and centrifuging. The supernatant fluid is removed and fresh saline added. The process is repeated three times when a uniform suspension of flagellates is obtained. With this suspension agglutination may be performed in test tubes by adding immune serum to any required dilution. The tubes are read after 24 hours. After reading they are shaken, and it will be found that if agglutination has taken place, a uniform suspension cannot be made. Agglutination was produced in dilutions varying from 1 in 100 to 1 in 500.

The tests proved that the six strains of flagellate were serologically identical so that there can no longer be any doubt that *Herpetomonas papatasii,* the naturally occurring flagellate of *Phlebotomus papatasii,* is identical with *Leishmania tropica* and that the last name is the correct one for the flagellate whether found naturally in the fly or in oriental sore.

C. M. W.

ADLER (S.) & THEODOR (O.). **The Behaviour of Cultures of** *Leishmania tropica, L. infantum,* **and** *L. braziliense* **in the Sandfly,** *Phlebotomus papatasii.* [Correspondence.]—*Nature.* 1927. Jan. 8. Vol. 119. No. 2984. pp. 48–49.

—— & ——. **The Behaviour of Cultures of** *Leishmania* **sp. in** *Phlebotomus papatasii.* [Correspondence.]—*Ibid.* Apr. 16. No. 2998. p. 565.

The authors have found that sand flies (*P. papatasii*) may be as readily infected with *Leishmania tropica* by feeding them on cultures of the organism through a membrane of rabbit skin as by the ingestion of leishmania from an oriental sore. The short sojourn of such culture forms in the fly would appear to increase their virulence, for the flagellates from such a fly which had died on the eleventh day (September 26th) after feeding on a culture were inoculated by scarification to the skin of the arm of a volunteer who was at the same time similarly inoculated at two spots on the other arm with flagellates from the same culture. By November 1st a papule containing leishmania had developed at the site of inoculation by the flagellates from the fly but up to November 16th, nothing had appeared on the other arm. The infection of sand flies from cultures of *Leishmania tropica* led to experiments with cultures of other species, viz., *L. infantum*, and *L. brasiliensis*. It was noted that in the flies they behaved quite differently from *L. tropica*. Though active division and, in the case of *L. brasiliensis*, marked morphological changes occurred the flagellates were confined to the stomach though in 2 out of 20 cases in *L. brasiliensis* they were also found in the lowest part of the cardia. In no case did they pass to the uppermost part of the cardia nor were any forms found attached to epithelium. It would appear that the invasion of the upper part of the cardia and the attachment to the epithelium which occurs in the case of *L. tropica* in *P. papatasii* and *L. donovani* in *P. argentipes* are indications that these flies are the actual transmitters. Should these observations be repeated with recently isolated cultures of *L. infantum*, it would be justifiable to assume that *P. papatasii* is not the vector of Mediterranean kala azar.

In the second note the authors point out that by error it was stated in the first that the fly from which the case mentioned was inoculated, was a " laboratory bred " fly. This was not the case, the insect being a wild one caught in Jerusalem. As the incidence of natural infection of flies in Jerusalem is either nil or so small as to be negligible the conclusion as to the source of the flagellates in the fly is not invalidated

C. M. W.

WATANABE (K.). Beitrag zur Kenntnis der Leishmaniosis cutanea. [**Study of Dermal Leishmaniasis.**]—*Japan Jl. Dermat. & Urol.* 1926. Nov. Vol. 26. No. 11. German summary pp. 63–66. With 2 figs. on 1 plate. [In Japanese pp. 999–1020. With 5 text figs. 139 refs.]

As Japan is not an endemic centre for cutaneous leishmaniasis the only cases met with in the country are imported. Such a case in a man who had resided for some years in Bolivia is recorded. He had an infection of the right ear. With material from the lesion a series of animals was inoculated in various ways. A rat inoculated intraperitoneally developed two nodules on the back and one on the neck; another rat similarly inoculated developed nodules on the face, neck and back, and acquired a generalized infection; a third rat intraperitoneally inoculated developed an ulcer on the left shoulder, while a rabbit inoculated in the right eyelid with material from one of the nodules in the first rat, developed ulcers on the upper and lower jaw, a nodule at the left angle of the mouth and another on the floor of the mouth. Leishmania were demonstrated in all these animals.

C. M. W.

PARROT (L.) & DONATIEN (A.). Leishmaniose cutanée primitive expérimentale de la souris blanche. [**Experimental Primary Cutaneous Leishmaniasis of the White Mouse.**]—*C.R. Soc. Biol.* 1927. Feb. 25. Vol. 96. No. 7. pp. 448–449.

It is pointed out that if mice are inoculated in the skin of the tail at 2 or 3 points with a few drops of culture of *Leishmania tropica*, in 8 to 10 days small nodules rich in leishmania will develop. Around these nodules the skin becomes infiltrated and finally ulceration with the formation of scabs occurs. In some cases the ulceration will extend till the whole tail, which may drop off, becomes involved. As a rule the mice remain in good general condition, and retain the infection for as much as 15 months. When the ulceration has been extensive, however, the animals ultimately become cachectic and die of a secondary bacterial infection. In such cases the spleen is either not enlarged or only slightly increased in volume and shows a scanty leishmania infection. The infection can be handed from mouse to mouse by inoculation of serum from the tail.

C. M. W.

MESSIK (R. E.). Ueber Thrombozytobarine gegen *Amoeba endolimax* und *Leishmania tropica*. [**Thrombocytobarine against Amoeba and** *Leishmania tropica*.]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Feb. 5. Vol. 101. No. 6–7. pp. 413–417. [10 refs.]

——. Ueber die Trombocytobarine gegen der Amoeba Endolimax und Leischmania Tropica.—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 210. [In Russian pp. 194–210. 10 refs.]

The presence of a substance, thrombocytobarine, in immune sera and its property of causing blood platelets to adhere to spirochaetes and trypanosomes has been shown by various authors to be a specific reaction. The present writer has immunized mice by injections of cultures of *Leishmania tropica* and a free-living amoeba termed *Amoeba limax*. The development of thrombocytobarine in the animals injected with leishmania was demonstrated but not in those injected with the amoebae. In the case of the leishmania-immunized mice, the thrombocytobarine remained in the blood for 3 to 6½ months. The substance was not found in the blood of young animals born of an immunized parent.

C. M. W.

JESSNER (Max). Wie sind die Aussichten einer Immunisierung gegen Hautleishmaniose und einer Therapie der Erkrankung mit Leishmaniavakzine? [**Prospects of Immunization and Treatment of Dermal Leishmaniasis by Leishmania Vaccine.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Feb. Vol. 31. No. 2. pp. 72–74.

The author is surprised that the possibility of vaccine therapy in leishmania infections has not attracted more attention. Apart from certain experiments of NICOLLE and MANCEAUX (1910, 1911) and ROW (1912) very little has been done. In a previous note (this *Bulletin*, Vol. 22, p. 686) the author in collaboration with AMSTER called attention to the fact that a definite skin reaction followed the injection of a vaccine into the skin of the dog and man, during or after recovery from *Leishmania tropica* infection. Attention was then directed to the possibility of employing the vaccine for purposes of immunizing against the infection. Dogs were used but, owing probably to the shortness of the time during which they were subjected to injections of vaccine, no immunity was produced. It was discovered, however, that dogs which had recovered from an infection were not immune to a second inoculation. The disease in dogs was, however, definitely influenced by vaccine treatment, the lesions ceasing to develop and healing more rapidly than in the controls.

The author suggests that the investigations are well worth pursuing in the case of human beings in countries where the disease is endemic.

C. M. W.

CHADWICK (C. R.) & MCHATTIE (C.). **Notes on Cutaneous Leishmaniasis of Dogs in Iraq.**—*Trans. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 422–432. With 28 figs. on 3 plates. [27 refs.]

Oriental sore is very common in dogs in Bagdad and other parts of Iraq, and one of its most notable features is its seasonal incidence. During the cold months affected dogs showing raw, repulsive-looking sores on the nose and about the eyes may be seen in any street or bazaar; yet, during the summer months, one may search Bagdad from end to end, and not be able to find a single case. During the period January 1st to May 30th, 1926, 28 cases diagnosed microscopically were encountered. Cases were seen in Bagdad, Mosul, Nasiriya, Baquba, Hillah, Amarah, Kirkuk and Khanaqin. As in man the disease attacks the exposed parts of the body—nose, lips, eyelids, internal surface of ears, toes, pads and other parts. The condition appears to be a purely local one as careful examination of the internal organs of certain cases, failed to reveal any generalized infection. The parasite from the sores appears to be identical with *Leishmania tropica* of human oriental sore. Canine kala azar does not appear to exist in Bagdad, as the examination of 130 dogs which were destroyed did not yield any case of this infection. Treatment of the canine oriental sore is useless, the disease running its natural course of nine months. The paper is illustrated by a series of photographs, showing the parasite and the lesions it produces.

C. M. W.

i. SERGENT (Et.), GUEIDON (E.) & PAGES (A.). Chronique du bouton d'Orient en Algérie (24e, 25e, et 26e, cas en dehors de la région saharienne). [**Oriental Sore in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 26–29. With one map in text. [5 refs.]

ii. BERTRAND (M.). Un nouveau cas de leishmaniose cutanée dans le Tell.—*Ibid.* p. 30. With 1 plate.

iii. BOISSEAU (A.). Sur un cas de bouton d'Orient contracté dans la région de Laghouat.—*Ibid.* pp. 31–34. With 1 plate.

i. A record of three further cases of oriental sore from the Tell district in the north of the department of Constantine.

ii. A case of oriental sore from the same region.

iii. A case of oriental sore in the south of the department of Algeria.

C. M. W.

GRAY (A. M. H.). **Case of Leishmaniasis.**—*Proc. Roy. Soc. Med.* (Sect. of Dermat.). 1926. Dec. Vol. 20. No. 2. p. 102.

A case of oriental sore in an Indian student who first showed signs of the infection six months after his arrival in England.

DE MELLO (Froilano) & CAMOTIM (V.) Premier cas autochtone de bouton d'Orient à Goa. [**First Case of Oriental Sore contracted at Goa.**]—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. p. 296. With 1 fig.

The record of a case of oriental sore in a soldier stationed at Margao, where the infection appears to have been acquired. This is the first case of the disease to be noted from Goa.

SERGENT (Edm. & Et.), PARROT (L.), DONATIEN (A.) & BÉGUET (M.). Observation et iconographie d'un clou de Biskra transmis par *Phlebotomus papatasi* (Scrop.). Etude expérimentale du virus.—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 1–19 With 24 figs. on 14 plates. [15 refs.]

With the addition of a few more photographs, this paper is the same a- that by the authors reviewed in this *Bulletin, ante,* p. 140.

ARAGÃO (Henrique). Palestra sobre Leishmanioses. [**Concerning Leishmaniasis.**]—*Sciencia Med.* 1927. Mar. 31. Vol. 5. No. 3. pp. 121–132. With 3 text figs. & 3 plates.

A general account of present knowledge on the subject of cutaneous leishmaniasis.

MAZZA (Salvador). Consideraciones sobre flebótomos encontrados en Tabacal y el papel de estos dipteros en la transmisión de las leishmaniosis. [**Phlebotomi met with in Tabacal and their Rôle in the Spread of Leishmaniasis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 310–317. With 8 text figs. [5 refs.]

After a preliminary dissertation on the present state of knowledge of the relationship of sandflies to cutaneous leishmaniasis an account is given of certain members of the genus *Phlebotomus* which were captured at Tabacal, in the Argentine, presumably from the point of view of their possible connexion with the cutaneous leishmaniasis of that country.

C. M. W.

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**MONIER-VINARD. Le kala azar : étude clinique et thérapeutique.**—***Rev. Prat. Malad. des Pays Chauds.*** **1926. Jan. Year 4. Vol. 5. No. 8. pp 391–407.**

## BLACKWATER FEVER.

i. MANSON-BAHR (Philip) & SAYERS (Edward G.). **Blackwater Fever in London. A Critical Study.**—*Lancet.* 1927. Feb. 5. pp. 273–277. With 1 chart in text. [16 refs.].

ii. GREENE (E. F.). **Blackwater Fever in England.** [Correspondence.] —*Ibid.* Mar. 12. pp. 568–569.

i. This paper is based on an analysis of 14 cases of blackwater fever which have developed in London during the last seven years. All the patients were Europeans who had returned from service in Africa, especially the West Coast, i.e., Nigeria 6, Gold Coast 3, Belgian Congo 2, Kenya 2, and N. Rhodesia 1. The length of sojourn in the endemic area varied in 11 cases from one to five years, average 3·2 years. In no case did blackwater develop later than 10 weeks after arrival in England; the average time was 4 weeks. The reacclimatization period is the period of danger. Antecedent syphilis seems to play no part, and the Wassermann reaction was performed in 5 instances before the onset of blackwater with negative results. In only one case was there a definite history of alcoholic excess. Sex and age appeared to have no influence on the incidence of the disease. The mortality rate in the authors' series was 50 per cent., which compares unfavourably with the average 23·5 per cent. worked out by THOMSON in over 1,000 cases in Rhodesia [this *Bulletin*, Vol. 22, p. 414.]

The relationship of the disease to malaria was carefully investigated, and the findings are in entire agreement with those of THOMSON. The evidence on this point is considered under three headings–endemic area, clinical history of subtertian malaria, and parasitic findings. Subtertian rings were found in 50 per cent. of the cases, and, considering that many of the patients came under observation only after the onset of blackwater, this is by no means a low proportion. A table is given correlating the parasite findings with the day of the disease.

Turning to the relationship of quinine to blackwater fever the authors state that they were unable to confirm entirely the statement of THOMSON that he had not seen a single case of blackwater in a person who had taken 5 grains of prophylactic quinine daily. Amongst their 14 cases 2 took 5 grains daily during their stay in Africa and also during the voyage to England, another had taken regularly 15 grains every Saturday and Sunday, and finally a child aged 3½ years had been given 2 grains of quinine daily since leaving the endemic area and during her stay of two months in England.

In this series of 14 cases it is difficult to escape the conclusion that quinine is a potent factor in precipitating the crisis: in all cases save one quinine had been given just prior to the attack, the doses varying from 5 to 28 grains daily. Details are given of several cases in which chill seemed to play a part as a precipitating factor.

After considering the clinical aspects and physical signs exhibited by their patients the authors turn to the urine. Minute observations of the urine were made only in two cases before the onset of blackwater. In one the only abnormality was a trace of albumen two hours before the onset, and in the other the urine was normal the day before the attack, but six hours before it contained urobilin and urobilinogen and also albumen and granular casts. The time of onset was usually in the early morning and the average duration 2·8 days (1 to 4 days). Suppression was not a marked feature in this series, two cases only exhibiting it. Bile was never found in the urine.

The observations on the blood are in agreement with those of other investigators. Before the attacks the picture is that of a severe case of subtertian malaria. In one case which recovered the red cells dropped to under a million per cmm. and the haemoglobin to 10 per cent. " A simple clinical observation regarding the presence of haemoglobinaemia was made in several cases." At the commencement of haemoglobinuria the colour-index is relatively high (in one case 1·5), but later it falls to normal or below it. The authors suggest that the high percentage of haemoglobin in the first instance is explained by the presence of free haemoglobin in the serum. [This is obviously an important question, but unfortunately, beyond the quite indefinite statement quoted above in inverted commas, no information is given regarding the presence or absence of haemoglobinaemia].* In only one case (fatal) were parasites extremely numerous. The cause of death in the seven cases was septic parotitis 1, acute cardiac failure 1, acute haemolysis 4, and pneumonia 1.

With regard to treatment the authors lay down certain broad principles. In the pre-blackwater stage the specific treatment of the subtertian malaria should be commenced with small and repeated doses of quinine, e.g., 1 grain at four-hourly intervals, gradually increasing the dose as tolerance is established. Every precaution should be taken against chill. As all work indicates that suppression is less likely to occur if the urine be alkaline, massive doses of potassium citrate, either alone or with sodium bicarbonate, should be given until the urine is alkaline; in most cases oral administration will suffice. During haemoglobinuria the urine, if not already made alkaline, as above, should be made so by the intravenous injections of sodium bicarbonate (150 grains to 1 pint of distilled water) as recommended by HANSCHELL. Not more than a pint should be given at a time owing to the very real danger of oedema of the lungs. Regarding the question of administration of quinine when once blackwater has commenced, the view is expressed that there is no evidence that the continued administration of the drug has any appreciable effect on the disease.

In cases with severe haemolysis the question of blood transfusion from a suitable donor is worth consideration and the authors are encouraged by the results obtained in one case.

The remainder of the paper is concerned with the theory of the genesis of blackwater fever based upon a study of these cases correlated with recent biochemical knowledge. That in subtertian malaria haemolysis occurs with each attack of fever is evident from the following facts: (1) progressive anaemia; (2) indirect positive van den Bergh reactions with the serum; (3) the presence in the urine of urobilin in pathological amounts; and (4) excessive formation of bile leading to bilious vomiting. The haemoglobin is split up into haematin (the iron-containing part) and globin (the iron-free protein part). It is generally maintained that haematin is gradually split up by the reticulo-endothelial system into : (1) an iron-free pigment haematoidin, or bilirubin, and (2) an iron-containing pigment, haemosiderin. The bilirubin is excreted by the liver, resulting in an increased flow of bile ; the liver, however, is unable to deal with the urobilin, which is absorbed from the intestine and therefore appears in the urine. At the same time the amount of bilirubin in the blood is increased. So long as the liver is functioning well, no bile will appear in the urine, because of the relatively high renal threshold in haemolytic jaundice which admits of the possibility of between 5 to 18 units in the serum without the appearance of bile in the urine. This is the probable explanation of the discoloured skin and lemon-tinted sclerotics which characterize subtertian malaria.

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* Dr. Manson-Bahr writes to the Editor:—" That haemoglobinaemia of an appreciable degree, easily detectable by the naked eye and by the spectroscope, was present was proved by two cases, in which 1 cc. of blood was abstracted and centrifuged directly after the onset of blackwater. The serum was tinged a cherry-pink and gave the spectroscopic bands of oxyhaemoglobin. The sentence containing this information has dropped out of this paragraph in setting up the type in our paper. I regret the omission."

The haemosiderin is deposited as brown or yellowish-brown granules in the liver, spleen, bone-marrow and kidney, from which it is later taken up to be utilized in the formation of new red corpuscles. In the majority of cases of subtertian malaria there is little or no haemoglobinaemia, but in a severe infection the reticulo-endothelium cannot deal with all the haemoglobin and a certain degree of haemoglobinaemia results. It is only when haemoglobinaemia reaches a certain level that haemoglobinuria occurs, because the kidneys have a definite threshold for haemoglobin.

After referring to the work of BAKER and DODDS (see below, p. 664) the authors pass to a theoretical explanation of haemolysis. They believe that blackwater is invariably associated with subtertian malaria; those cases in which *P. vivax* only have been found are regarded as double infections, and those which have developed in the course of the malarial (*P. vivax*) treatment of general paralysis are dismissed [without the slightest evidence] as really cases of paroxysmal haemoglobinuria. Haemolysis occurs in the spleen pulp and capillaries of the internal organs and coincides with the full development of schizogony of *P. falciparum.* It is possible that in blackwater full development of schizogony of a very large number of parasites might be obtained at the same moment. The haemolysis in the spleen would then be extreme and the amount of free malarial haemolytic toxin liberated proportionately great. The absorption of this sudden massive dose of malarial toxin into the general circulation leads to general haemolysis. [If this be so, one would expect that the presence of this haemolytic substance might have been recognized ere now by *in vitro* observations.]

There are two possible ways in which quinine may act in the production of blackwater. It has been shown by KINGSBURY that the administration of quinine in subtertian malaria is always followed by an increase in the serum bilirubin. This means that quinine causes definite haemolysis of the infected red cells, and it is conceivable that this increased haemolysis might just be sufficient to precipitate the onset of blackwater.

There is evidence that quinine can cause contraction of the spleen by a specific action on the non-striped muscle of that organ (CUSHNY, 1924). A sudden contraction of a heavily-infected spleen, even if only of very short duration, would force a very large amount of haemolytic toxin into the general circulation, and might thus cause a profound haemolysis.

ii. The author writes that while it is impossible to controvert much of the theory in the above paper, there are almost epidemic forms of blackwater that do not harmonize with the subtertian causation. The author believes that the blood picture in subtertian malaria is essentially different from that seen in blackwater; he considers that the whole question is most important, because it raises the point whether quinine should or should not be administered for severe malaria; good results can be obtained from phenacetin in malaria and possibly with less danger. [A statement like this seems in the present state of knowledge to be a dangerous doctrine and unjustifiable unless supported by adequate data dealing with the action of phenacetin in *P. falciparum* infection.] The author likewise has doubts about the value of quinine as a prophylactic and mentions that he himself has had two severe attacks of malaria notwithstanding the fact that he has always taken quinine religiously whilst in W. Africa.

The letter concludes as follows:—

> "During five years' work on the coast of Africa, I had always a microscope at hand with me and examined every blood-infected case that I had to deal with. I never saw any other medical man using a microscope in daily practice, except in the hospitals of Free Town, Accra, Calabar, and Lagos. The medical officer in Africa ordinarily has not the time at his disposal for much microscope work."

[This is a terrible and, one must hope, unwarrantable indictment. How any man can practise conscientiously in the tropics without constant recourse to a microscope, it is impossible to conceive.]

W. Yorke.

MACMILLAN (R. J. A.). **Report on Blackwater Fever in Uganda for 1925.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended* 31*st December,* 1925. pp. 67–69.

During the year 1925, 81 cases of blackwater fever were treated in Uganda and of these 22 ended fatally.

In considering the distribution of these cases, the author points out that although there is an increase in the number in Buganda and the Eastern Province, this is probably due to the fact that the European and Asiatic populations have greatly increased in these two provinces. The greatest number of cases occurred in July when the weather was wetter and colder than usual; the smallest number occurred in March and October, when the weather was warmer than usual.

The greatest incidence of malaria was in June and the smallest in February. Ten of the patients were Europeans and three died; 71 were Asiatics and 19 died. Information is given regarding the age, sex, and length of residence in the Tropics. Of the 81 cases, 25 had had previous attacks of blackwater. It is considered that malaria is undoubtedly the predisposing cause, every patient having previously suffered from this disease. The records suggest that almost anything will precipitate an attack of blackwater fever, e.g., worry, chill, over exertion, quinine, alcohol, etc. Information is given regarding the quinine habits of the patients. Ten are stated to have taken quinine regularly as a prophylactic and 53 to have taken it irregularly. In 13 cases the blood was examined prior to the attack, and in 7 cases parasites were found, six being *P. vivax*, and one a mixed infection of *P. vivax* and *P. falciparum*. Of the 56 cases examined during the attack, 25 were positive, 16 showing *P. vivax* and 9 a mixed infection of *P. vivax* and *P. falciparum*. Information is given in a table of the duration of the haemoglobinuria in 74 cases. The cause of death in the 22 cases was as follows: Cardiac failure 17, suppression and cardiac failure 2, suppression and uraemia 2, exhaustion 1.

W. Y.

WESELKO (Otmar). Sullà emoglobinuria da malaria nel distretto della Stazione antimalarica di Scardona (Dalmazia) e sul suo trattamento con calcio e peptone. [**Malarial Haemoglobinuria in the District of the Antimalaria Station of Skradin (Dalmatia) and its Treatment with Calcium and Peptone.**]—*Riv. di Malariologia.* 1926. Sept.-Dec. Vol. 5. No. 5–6. pp. 653–659. With 1 chart & 1 map in text. [English summary p. 739.]

In Dalmatia, there are places where cases of malaria and blackwater fever occur annually, and in the district of Scardona 49 cases of blackwater have been noted between 1922 and the end of 1926. The local distribution of these cases is shown in a table from which it appears that Dubravizze is the main focus; it is remarked that subtertian malaria is also most prevalent in this place. Of the 49 cases, 24 occurred during the year 1924, and the author considers that this was possibly, in part, due to lack of proper nourishment.

All the patients gave a history of malaria; the duration of the malaria had apparently no influence on the blackwater fever, four cases of this disease occurring after the third attack of malaria.

In a table is given what the author regards as the immediate cause of the attack in the 49 cases; in the great majority it was a dose of quinine in some form or another. The symptoms exhibited by the patients are summarized and this is followed by a discussion on treatment. The first cases were treated as recommended by MATKO with disodium phosphate, but this method was soon abandoned as the results were unsatisfactory. Weselko believes that in blackwater fever two pathogenic factors have to be considered: firstly a change in the ionic equilibrium, in which calcium deficiency is the main alteration, and secondly, an increase of complement caused by quinine or other agents. Acting on this hypothesis he tested the therapeutic value of calcium either by the mouth or intravenously, combined with intramuscular injections of Witte's peptone (10 cc. of a 5 per cent. solution up to 3 injections daily). The results are stated to have been good.

W. Y.

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EMILE-WEIL (P.) & STIEFFEL. Recherches cliniques sur l'hémoglobinurie. [**Clinical Researches on Haemoglobinuria.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. Apr. 22. Year 42. 3rd Ser. Vol. 50. No. 13. pp. 587–596. [2 refs.]

The question of haemoglobinuria in general and of paroxysmal haemoglobinuria in particular still remains obscure notwithstanding all the work that has been done. Haemoglobinuria *a frigore* is regarded as a special disease, and Donath and Landsteiner's reaction has been considered as pathognomonic of it. The authors describe in detail two cases which exhibited haemoglobinuria without exposure to cold, but in whom the Donath and Landsteiner reaction was unquestionably positive.

From their study of these two cases, the authors lay stress on a number of points:—

1. *The pulmonary symptoms of the haemolytic crisis.* These consist of air hunger and a sensation of cervical and thoracic constriction with dyspnoea; sometimes there are violent fits of coughing. Similar signs have been observed after transfusion of blood. One of the patients had frequent asthmatic attacks.

2. *The frequency of haemoglobinuria : the unrecognised haemoglobinurias.* It is current opinion that haemoglobinuria is a rare condition. This is true of the severe attacks, but with regard to mild forms its truth is doubtful. In the course of a year the authors have discovered by careful examination, four cases of haemoglobinuria, and of these only one was sent to hospital as an example of this disease. The authors believe that these cases escape notice because in the first place they are confused with haematuria, and in the second place because latent haemoglobinuria is difficult to recognize if one is not on the look-out for it. Instances of each class of case are given.

3. *The identity of haemoglobinuria* a frigore *and the other haemoglobinurias, infective and toxic.* The authors pass to a consideration whether more than one factor can precipitate in any case an attack of haemoglobinuria. They quote the interesting case of ROCH and LIENGME (1922) who whilst studying a patient suffering from true haemoglobinuria *a frigore* found that an attack could be precipitated by an intravenous injection of casein, or by the oral administration of 10 gm. of sodium chloride. Turning to the authors' two cases it is noticed that the first never suffered from any sensation of chill so characteristic of haemoglobinuria *a frigore*, but was probably an infective case since the haemoglobinuria was complicated by signs of acute pulmonary congestion, and bacteriological examination of the urine showed the existence of a Gram-positive encapsulated diplococcus. In the second case no definite cause of the haemoglobinuria was discovered ; the case was one of benign purpura. It is emphaized that both subjects gave the serological reactions of haemoglobinuria *a frigore* and that although the initial crises were not produced by exposure to cold, yet such exposure was capable of producing attacks. It is further noticed that in the first case, small doses of novarsenobenzol sufficed to cause attacks of haemoglobinuria.

The authors think that distinction between the haemoglobinurias should not be made and that paroxysmal haemoglobinuria should not be separated from haemoglobinurias which are not paroxysmal.

W. Y.

STEPHENS (J. W. W.). **The Haemoglobinurias.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 401–411. [15 refs.]

The author states that this paper was put together at very short notice, and its scope was consequently determined by the matter he already had and not by deliberate selection. Many of the haemoglobinurias are omitted, e.g., the toxic haemoglobinurias and those due to piroplasmosis, and the haemoglobinuria of blackwater fever is only briefly alluded to, mainly because that subject requires a paper to itself.

The following conditions are dealt with :—

1. *Myoglobinuria.* Muscle contains two pigments. (1) Muscle haemoglobin differing from blood haemoglobin in that its bands are nearer to the red end of the spectrum, and (2) Cytochrome, a respiratory pigment of wide distribution in animals, yeast, bacteria, and plants ; in the oxidized condition it gives no bands, but on reduction it shows four bands (at 6035, 5645, 5490 and 5190),

A. Myoglobinuria of the horse. This is seen in horses long stabled on rich food, which undergo sudden exposure to cold or exertion. The symptoms and pathological appearances are described and it is recorded that MEYER-BETZ (1910) found no haemoglobin in the blood.

B. Myoglobinuria of man. A summary is given of two cases, one recorded by MEYER-BETZ (1911) and the other by GUNTHER (1924).

2. *March haemoglobinuria.* FIEGL (1916) records the result of the examination of persons who had marched 35 kilometres. Of 26 examined, 18 (70 per cent.) had haemoglobinuria and of these, 8 had red cells in the urine, 3 had haemoglobin only in the serum, 2 had haematin only, and 6 had haemoglobin + haematin. A summary is given of 5 cases of this condition described by various authors.

3. *Lordotic haemoglobinuria.* PORGES and STRISOWER (1914) in their case, stated that an attack could be induced by walking even for ten minutes in a pronounced lordotic position, while in the upright or kyphotic position no attack, or only a very delayed one, occurred. FÖRSTER (1919) in his case, found no evidence of this, as in the kyphotic bicycling position attacks also ensued. PORGES and STRISOWER suggest that the splenic vessels are constricted, leading to the development of haemolysis; their patient experienced pain in the left psoas muscle, but they did not especially consider this symptom.

4. *Paroxysmal haemoglobinuria.* This condition is characterized by the existence in the blood of the cold amboceptor or haemolysin. Certain precautions must be observed in performing the Donath-Landsteiner reaction. The coagulation temperature at which the serum is obtained is important; 37° C. is the optimum. Oxalated plasma may give a slight or completely negative reaction, with the usual direct technique (i.e. plasma+red cells kept at 0° C. for a time, and then warming to 37° C.), but it gives a positive reaction with the indirect method (i.e., plasma+red cells kept at 0° C. concentrated in the cold and the plasma removed, complement added to the red cells and warmed to 37° C.) Prolonged cooling for some hours may give a negative reaction. Salt solution may entirely interfere with the lytic action of the complement. Cold amboceptor is sensitive to cold and is destroyed in 18 hours at 0° C. Concentration of the red cell emulsion is important; it should be a maximum and should be prepared at 37° C. The cold amboceptor has a peculiar selective action on the red cells, haemolysing particularly the so-called old cells. The cells of obstructive jaundice are very susceptible to the cold amboceptor. The cold amboceptor acts well on autologous and isologous cells, but not on heterologous cells.

An account is given of the symptomatology, and of the urine and blood. Among the rarer forms of haemoglobinuria mentioned are: Haemolytic jaundice, pernicious anaemia, Raynaud's disease, angioneurotic oedema, internal haemorrhage, haematuria and specific fevers.

In blackwater fever the amount of haemoglobin passed in the urine in a severe case amounts to some 100 cc. of red cells. Simple calculation shows that this represents only about one-twentieth of the haemoglobin lost. Red cell destruction is not necessarily followed by haemoglobinuria, as is clearly shown by experimental work and the injection of haemolytic substances like toluylenediamin.

Urobilin (or urobilinogen) occurs normally in the urine; it is not secreted continuously in uniform concentration, but, on the contrary, in spurts of relatively high concentration, two or three hours after a meal. According to SALEN urobilin represents a daily moult of red cells.

The article closes with a reference to the life of a red cell. As a result of certain calculations this is estimated to be from 10 to 40 days.

W. Y.

GHIRON (Mario). Studien ueber die Pathogenese des Schwarzwasserfiebers. [**Studies on the Pathogenesis of Blackwater Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Feb. & Mar. Vol. 31. Nos. 2 & 3. pp. 63–72; 113–125.

The first portion of these papers is concerned with a general review of previous work dealing with such questions as the presence or absence of a haemolysin in the serum; what influence the red cells of the haemopoietic system have on the precipitation of a blackwater fever attack; how far quinine salts can alter the behaviour of the serum and red cells; the significance of the various malaria parasites; the significance of lipoids in combination with quinine; the site of the haemolytic processes; and the mechanism of the origin of blackwater fever. The author gives the following summary of his own observations:

He has worked with the serum of four individuals, who at the time of entering hospital were suffering from a severe attack of blackwater fever.

The serum was withdrawn at the time of arrival and also each three or five days afterwards in order to study its variations.

The blackwater fever serum showed *in vitro* a definite haemolytic power against the red cells saturated with quinine. Of the red cells, which were obtained from patients suffering from various diseases and also from normal persons, those coming from patients with tertian or tropical malaria (whether they had, or had not, been treated with quinine) exhibited in the highest degree the capacity for being haemolysed. Thus, in order to obtain a definite haemolytic effect, the combined action of two factors is necessary: (1) Red blood corpuscles from a malarial source, and quinine; and (2) Blackwater fever serum.

The significance of the haemolytic curve becomes clear:—

(1) From the comparison of the haemolytic curve with the hardly perceptible curve of red blood cells in quinine solution.

(2) From a comparison of the haemolytic phenomena of quininized red cells with those withdrawn from various healthy and diseased persons.

(3) From the part which malaria corpuscles appear to play.

It can thus be concluded that in blackwater fever not only is a haemolysin present, the existence of which is perceived when the red cells have absorbed quinine, but that this haemolysin can, for practical purposes, only be brought into action when the red cells are of malarial origin.

The part played by the constitution of the red cells is not clear, and the results of the author's optical experiments are not sufficient to arrive at a definite judgement.

It is, however, clear that a haemolytic substance is present in every case of blackwater fever, and that this can be demonstrated by the method here described: this haemolysin acts in various concentrations and can disappear from the organism after a certain time.

The characteristics of the reaction are :—

1. A blackwater fever serum with active haemolysin can disclose the presence of a malaria infection in the person who supplies the red cells.

2. Quininized malaria blood cells can make manifest the haemolytic power of a serum, if the serum comes from a person who has had a definite, or latent and clinically incomplete, attack of blackwater fever.

W. Y.

KONDO (Y.). **Investigation on the Genesis of Blackwater Fever.**—*Taiwan Igakkai Zasshi.* (*Jl. Med. Assoc. Formosa*). 1926. Mar. No. 252. English summary pp. 1-3. [In Japanese.]

The author summarizes his observations on 98 cases of blackwater at the Government Hospital in Taito, Formosa ; of these 94 were Japanese and 4 were Formosan-Chinese. *P. falciparum* and *P. vivax* were found in about an equal number, whilst *P. malariae* was only rarely met with. The osmotic resistance of the red blood corpuscles of blackwater fever patients was found to be considerably lower than normal, and this was also the case in respect of the resistance of the red cells to quinine hydrochloride. The haemolytic action of antipyrin, antifebrin, and of alcohol, and the influence of the solar rays, temperature, bile, grape-sugar, haemoglobin, serum and carbonic acid gas upon the haemolytic phenomenon were next considered.

The amount of grape-sugar in the blood of malaria patients is higher during the attacks than in the intervals. Lecithin, which of itself is only a feeble haemolytic agent, increases to a considerable extent the haemolytic action of quinine hydrochloride. The content of lecithin in the blood of malaria patients is, as a rule, much higher than that of healthy persons. Grape-sugar inhibits to some extent the haemolytic action of lecithin.

The symptoms of malarial haemolytic icterus are similar to those of hereditary haemolytic icterus, viz. anaemia, jaundice, enlargement of the liver and spleen, yellowish-brown excreta, urobilinuria, a large proportion of reticulated blood corpuscles and a directly negative, but indirectly positive diazo-reaction of the serum. Cases of blackwater fever, like those of malarial haemolytic icterus, exhibit in their blood a great number of basophilic reticulated red cells. These cells are very sensitive to hypotonic saline and to quinine hydrochloride, and consequently if patients suffering from malarial haemolytic icterus, which apparently is a pre-blackwater fever condition, are given quinine hydrochloride haemoglobinuria is precipitated.

The author believes that the basophilic reticulated red cells are young corpuscles. They are found in anaemia conditions and also in the severe anaemia produced in rabbits by injection of phenylhydrazin hydrochloride. When quinine hydrochloride is given to such rabbits, slight haemolysis results, and this becomes much more intense if artificial icterus is previously induced. The viscosity of the blood in blackwater fever patients is generally lower than normal. Spirochaete-like bodies were found in only a few cases, but other " very small particular granules " occur in considerable abundance.

Dealing with the genesis of blackwater fever, the author considers that the remains of the red cells which have been destroyed by malaria irritate the bone-marrow, and that as a result a large number of basophilic reticulate cells are produced ; then from a number of causes, e.g. exposure to wet, cold, extreme heat, or intense sunlight, and especially an administration of quinine, sudden haemolysis of the numerous basophilic red cells takes place and blackwater fever results.

W. Y.

PEREKROPOFF (G. J.). Ueber Schwarzwasserfieber. [**Blackwater Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. July 1. Vol. 30. No. 7. pp. 284–288.

After briefly reviewing the literature concerning the relationship of malaria and quinine in the genesis of blackwater fever, the author turns to his own observations. He states that he has succeeded in producing haemolysis *in vitro* in six cases : and that, in later work on the artificial cultivation of tertian parasites, he has observed haemolysis in a further six of sixty-two cases. The haemolysis occurred in patients who had not been treated with quinine and consequently this drug does not come into the question. The observations seem to indicate that the parasites themselves possess the haemolytic property, and caused the author to employ quinine in two cases of blackwater fever. The first case unfortunately could not be followed up completely ; the second was a person who had tertian malaria, but who had never previously had malaria or taken quinine.

Details of the second case are given, from which it is seen that the patient had developed blackwater fever whilst suffering from tertian malaria. Peruvian bark had no effect either on the malaria or on the blackwater. The administration of quinine (·15 gramme twice daily) brought the attack to an end, the urine clearing, and the parasites disappearing from the blood.

W. Y.

BLANCHARD (M.) & LEFROU (G.). Considérations cliniques pathogéniques et thérapeutiques sur la fièvre bilieuse hémoglobinurique à spirochètes. [**Clinical Considerations on Blackwater Fever due to Spirochaetes.**]—*Bull. Soc. Path. Exot.* 1926. May 12. Vol. 19. No. 5. pp. 345–352. With 9 charts in text. [6 refs.]

The authors enquire whether the cases of blackwater fever in which spirochaetes are found differ from those in which spirochaetes are not found ; and in order to decide the point, they give clinical details of 9 cases of the disease which came under observation at Brazzaville, 4 of them having spirochaetes and 5 of them not having spirochaetes. The temperature charts of the 9 cases, all of which are given, are first considered. In 4 of the 5 cases in which spirochaetes were not found, the temperature rose suddenly to 39° or 40° C. and then fell almost equally quickly ; the colouration of the urine followed suit ; the haemolytic crisis ended within 48 hours, and convalescence set in. Quite different is the state of affairs in those cases in which spirochaetes were found. The febrile disturbance commences suddenly, but it subsides slowly or persists with oscillations for some time ; the urine remains coloured for longer, and only gradually clears. The fifth case without spirochaetes, however, fell also into this category, a fact which shows the difficulty of arriving at a clinical diagnosis.

The authors then pass to a consideration of the other two cardinal symptoms, viz., haemoglobinuria and jaundice. Of the six cases examined when the urine was still coloured, only one exhibited haemoglobinaemia. This was a case in which spirochaetes were not found ;

the examination of the cases in which spirochaetes were found and also of one other case in which they were not found was negative. The authors, however, consider this test too difficult and too uncertain for the practical purposes of diagnosis.

Turning to jaundice the authors state that there are three types of icterus, viz., that due to obstruction of the bile ducts, that due to insufficiency of the blood, and that due to insufficiency of the liver. In two cases with spirochaetes the urine contained bile pigments, in one case both bile pigments and salts and in the other case only the salts. The presence of both pigments and salts eliminates the haemolytic origin of the jaundice and the existence of bile salts alone implies hepatic insufficiency. It is concluded that in all the cases with spirochaetes the jaundice is due to hepatic insufficiency, and is related to the presence of spirochaetes in the liver and a consequent hepatic toxaemia. In one case without spirochaetes, bile pigments alone were found in the urine and in another case, neither pigments nor salts. Study of the literature suggests that bile pigments are found only exceptionally in the urine and that consequently the icterus is of the haemolytic type, but, unfortunately, in cases without spirochaetes this is not always so.

The paper closes with some remarks on treatment, but as they relate to so few cases they do not require special notice.

W. Y.

WHIPPLE (G. H.). **The Pathology of Blackwater Fever.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 1–14. [1 ref.]

The author recalls that in 1909 he published a paper entitled "Blackwater fever and pernicious malaria in Panama" in a new periodical *Malaria.* This journal ran for two years only, and consequently few libraries possess it. At various times DARLING and others had urged the author to publish his data in one of the recognized journals, and the present paper is evidently the result of this request.

It is surprising to find so few papers giving a careful description of the histological lesions of blackwater fever. The author's material was obtained very shortly after death, and studied under favourable conditions. A detailed account of the morbid anatomy and histology of four cases of the disease is given.

The following is the author's summary of his findings :—

"The kidneys in haemoglobinuria are usually a little enlarged, the surface a deep red or mottled red and yellow, the cortex swollen and stippled with red or black dots looking much like ecchymoses, but in reality due to the haemoglobin in the tubules. The organ may have a yellow or even a greenish tint if the jaundice is very marked. If acute nephritis has supervened the cortex is usually greatly swollen and edematous. The pyramids are a uniform deep purple. Acute nephritis is not a constant finding, and the kidneys in 5 cases out of 9 showed no signs of injury from the presence of the haemoglobin in the tubules. Three cases of combined pernicious malaria and blackwater fever presented no evidence of acute nephritis. The kidneys of pernicious malaria are usually normal, except for a little cloudy swelling, but may show an acute nephritis.

"The spleen is perhaps the organ of greatest interest as it shows such definite changes in all its elements—changes that we are accustomed to associate with a toxemia, comparable to that of diphtheria, septicemia, or even typhoid. The spleen is always enlarged in both diseases (malaria and blackwater fever), and in these cases weighed from 185 to 1,250 grams, perhaps an average of 300 to 500 grams. In blackwater fever the organ presents a bright red or purple velvety pulp and swollen, opaque, sharply outlined Malpighian bodies. It is usually friable in both diseases. In malaria the spleen pulp is of a dark chocolate colour in acute cases, or a slaty or very dark colour in the more chronic cases, and the Malpighian bodies are inconspicuous. Necrosis may be the striking feature of the microscopical picture of blackwater fever, and in acute cases (1,507 and 1,435) may involve a great part of the pulp and Malpighian bodies. The pulp may show a delicate reticulum of fibrin, many nuclear fragments, polymorphonuclear leucocytes, and huge phagocytes in all sections. The endothelium is almost invariably spared and stains sharply, but the venules may contain numbers of little fibrinous thrombi including leucocytes and large phagocytes. Malarial pigment may be scarce or abundant. The Malpighian bodies in the great majority of cases present a central necrosis indicated by the presence of fibrin, nuclear fragments, polymorphonuclear leucocytes, large phagocytes and edema of the tissues. This necrosis may involve only a small part or almost the entire lymph follicle. Pernicious malaria may show these same necroses, but they are much less in evidence, and more apt to involve the pulp alone. Barker has described similar changes in malaria. The spleen in some cases of acute malaria may show no evidence of necrosis, but enormous amounts of malarial pigment free or enclosed in phagocytes. The number and size of the huge phagocytes which may be so conspicuous depends upon the amounts of malarial pigment and cell necrosis, not upon hemolysis.

" The lymph glands and lymphatic apparatus of the intestines may show similar changes in these two diseases. The picture may resemble that described in the spleen, but the necrosis is less in evidence. The lymph follicles may show central necroses of smaller size, but quite like those in the Malpighian bodies, and the marginal lymph sinuses may be distended with wandering cells and phagocytes of all types. This change depends in great part upon the processes going on in the tissues drained by the respective glands, and is a pretty accurate index of this change. It seems fairly conclusive that the finding of large grains of malarial pigment in the glands at the hilum of the liver and round the head of the pancreas indicates an attack of malaria at some previous time or an attack of long duration. These glands bear the same relation to the liver and spleen that the bronchial glands do to the lungs.

" The bone-marrow is hyperplastic in nearly all cases depending on the duration and severity of the blood destruction. Hyperplasia was absent in one case of pernicious malaria. It is rather remarkable that the marrow shows almost no evidences of cell necrosis ; noted in but two cases. The marrow elements all show hyperplasia, but this reaction is more striking in the red corpuscle groups. In some cases the giant bone-marrow cells (megalokaryocytes) are numerous. The striking feature is a distinct relative increase in eosinophile marrow cells, both mono- and polymorphonuclear cells. This is conspicuous in smears and microscopical sections from the rib and femur. It is well known that both diseases show a leucopenia and decrease in eosinophile cells in the circulating blood (Christophers and Bentley). Perhaps the explanation for this may be that the blood destruction stimulates the marrow to activity and all its elements are included in this reaction, but the red cells are hurried away to replace the destroyed corpuscles. The eosinophile cells which do not appear in the blood may be retained in the marrow because of some chemical stimulus which repels these specialized cells, and attracts the large mononuclear cells.

" The liver may be of normal size, but is usually slightly enlarged (weight 1,600 to 2,350 grams). The colour in blackwater fever is usually a pale chestnut brown or bronze colour when there is little malarial pigment. In malaria the colour may be a greenish or slaty colour depending upon the amount of jaundice and malarial pigment. The gall bladder in acute blackwater fever is quite characteristic and is distended with a dry, curdy or finely granular, dark greenish-black bile. Focal necroses are unusual in pernicious malaria but are common and may be extensive in blackwater fever. The liver capillaries may contain hyaline thrombi in both diseases. Hemosiderin is found in the liver cells frequently in blackwater fever and is more conspicuous in the centres of the lobules, but it may be found in pernicious malaria. The bile canaliculi are more conspicuous in blackwater fever depending upon the depth of the jaundice.

"The brain in blackwater fever is very pale and waxy looking, but otherwise normal. In malaria the brain cortex may have a distinctive appearance, either a deep rose pink or a pale slaty colour. Its consistence is like firm jelly, and it cuts like gelatin. This firmness may be due to the great engorgement of its capillaries which are stuffed with malarial parasites and red blood cells. Ecchymoses are not rare and are present in both white and gray matter.

"The other viscera present no features of especial interest.

"This comparison of the two diseases shows a great similarity and indicates that a malarial infection is an unfailing factor in all cases. The microscopical pictures are very like and show that there is a circulating poison in both diseases which is very similar in its action, but more intense in blackwater fever. Perhaps it may be safe to state that blackwater fever is malaria plus an unknown factor—probably a poison that develops as a result of some reaction against the malaria."

W. Y.

CHATRIEUX (H.). Action manifeste du froid dans la fièvre bilieuse hémoglobinurique. [**Evident Action of Cold in Blackwater Fever.**]—*Bull. Soc. Path. Exot.* 1926. Jan. 13. Vol. 19. No. 1. pp. 69–71.

An account is given of three cases in which an attack of blackwater fever was precipitated by cold. These three cases are, in the author's opinion, worthy of record in that they show that blackwater can occur in persons who have been only a comparatively short time in the tropics—Case 1 had lived in Dakar for only six months—and that it may occur in people who have never previously exhibited signs of malaria. No mention is made that any of the three cases had quinine before the attack of blackwater. Reference is made to the fact that LE DANTEC had observed that cold is liable to precipitate blackwater.

W. Y.

ROSS (G. R.) & PEALL (G. H.). **Icterus without Haemoglobinuria after Quinine Treatment.**—*Brit. Med. Jl.* 1927. Jan. 8. pp. 53–54 [13 refs.]

Reference is made to the theory of PLEHN (1920) that in blackwater fever haemolysis takes place in the renal tubules and to that of BARRATT and YORKE. (1909) and others, that it occurs in the blood stream. [This important question has been dealt with by the reviewer in some detail; see this *Bulletin*, Vol. 19, p. 631]. It is stated that while direct proof of haemoglobinaemia may be lacking, it is possible to obtain information indirectly supporting this hypothesis from the discovery of an increased content in the blood stream of substances which are known to be derivatives of haemoglobin.

It is now generally accepted that haemoglobin is broken down in the cells of the reticulo-endothelial system, particularly, if not wholly, by the Kupffer cells which are found in the liver sinuses, and is converted into bilirubin and haemosiderin. Thus in conditions in which haemolysis exists an increased output of bilirubin can be anticipated. Van den Bergh's test not only affords a measurement of the amount of bilirubin present, but it also distinguishes between what might be termed mature and immature bilirubin in the serum. Mature bilirubin is that which has passed through the polygonal cells of the liver, and has then been absorbed into the blood stream, and is present in cases of obstructive jaundice; this variety gives the direct reaction. If, however, owing to rapid blood destruction, bilirubin is produced at so rapid a rate that the polygonal cells are unable to deal with it *in toto*, the excess is absorbed directly into the blood stream from the Kupffer cells, and forms the immature bilirubin which gives the indirect reaction. Such a reaction can be accepted as evidence of intravascular haemolysis.

In haemoglobinuric fever, in the initial stages of the disease, the indirect reaction is strongly positive and the number of units of bilirubin shows a huge increase in the normal amount of ·2 to ·5 units found in normal controls. There is thus indirect evidence that the haemoglobinuria in blackwater fever is accompanied by haemoglobinaemia. Two mechanisms at least come into play in the endeavour to rid the body of the haemoglobin dissolved in the plasma. First there is an increase in the activity of the reticulo-endothelial system, so that as much as possible of the haemoglobin may be disposed of by the normal methods of converting it into bilirubin. This we know does happen. If, however, the amount of haemoglobin is in excess of the maximum with which the reticulo-endothelial system can deal, then excretion by the kidneys occurs, with consequent haemoglobinuria. It cannot be assumed at present that the reticulo-endothelial system functions equally in every individual, but it is known that if the haemolysis be slow and gradual, as in pernicious anaemia, or even sudden but relatively slight, as in malaria, haemoglobin does not appear in the urine.

Turning to the question of quinine haemolysis *in vivo*, the author writes that it is conceivable that if quinine can produce haemolysis sufficient to cause haemoglobinuria, cases might occur in which the degree of haemolysis is so slight that the free haemoglobin can be disposed of entirely by the reticulo-endothelial system without the appearance of haemoglobin. Koch (1898) stated that after the administration of quinine an attack of icterus may occur; and Blacklock (1923) believes that haemolysis with slight jaundice can occur without haemoglobinuria and that this condition is frequently due to the same cause as blackwater fever. [See this *Bulletin*, Vol. 21, p. 62.]

Details are then given of a case which can be regarded as an example of haemolytic jaundice after quinine treatment without the development of haemoglobinuria. This case in the author's opinion is an example of an intravascular haemolysis, evidenced by jaundice, but with no accompanying haemoglobinuria. It is noted that the icterus did not make its appearance clinically until the twelfth day after commencement of the quinine treatment, but the sallowness of the patient and lemon-yellow conjunctivae, so characteristic of chronic malaria, prevented the appreciation of slight additional degrees of icterus. Furthermore, the dosage of quinine was exceedingly small; only $1\frac{1}{2}$ grains were given daily and only $5\frac{11}{32}$ grains had been given altogether when the jaundice became clinically apparent. The disappearance of the icterus on the stoppage of quinine treatment affords additional support to the belief that the quinine acted as a haemolytic agent

W. Y.

BAKER (S. L.) & DODDS (E. C.). **Obstruction of the Renal Tubules during the Excretion of Haemoglobin.**—*Brit. Jl. Experim. Path.* 1925. Oct. Vol. 6. No. 5. pp. 247–260. With 3 text figs. & 1 plate. [2 refs.]

The authors refer to the work of YORKE and NAUSS (1911), who showed that it was possible to produce in some cases a renal obstruction in rabbits by injecting them with solutions of their own haemoglobin; this was due to the fact that the pigment, as it passed through the kidneys, became precipitated in the tubules and so produced an obstruction.

The authors' own investigations concern intra-renal obstruction as observed on two occasions during the last two years in patients who have succumbed from renal insufficiency following blood transfusion, and an experimental investigation into the mechanism of production of renal lesions during the excretion of haemoglobin. Clinical details are given of the pathological appearances of the kidneys. The renal lesions appeared to be identical with those known to occur in blackwater fever. Turning to their experimental work, the authors confirm the observations of YORKE (1911) and of BAYLIS (1920) that rabbits injected with haemoglobin are liable to die suddenly either during, or shortly after, the injection. They found, however, that if the haemoglobin solutions were efficiently filtered, sudden death was avoided. The effect of the injections on the renal functions was controlled by the animal's blood urea. Several injections (10–15 cc. each) of strong haemoglobin solution produced gradually rising blood urea. After seven such injections spread over a period of three weeks, the animal was in a very weak state with a blood urea of 297 mgm. per 100 cc. The conditions of the kidneys resembled that described by YORKE and NAUSS. It was observed that the brown urine showing a granular precipitate was always strongly acid, while the red urine was neutral or alkaline. As YORKE and NAUSS have noted, it is impossible to produce renal obstruction in rabbits, unless the animals are kept short of green food. The correlation between acidity of the urine and the brown granular casts which obviously tend to obstruct the renal tubules lead the authors to consider the influence of diet on the reaction of the rabbit's urine. Rabbits normally pass strongly alkaline urine, but in the absence of green food, although unlimited water is supplied, the urine can be kept permanently acid.

An experiment is described in which the rabbit was fed for several days on a diet of oats and bread with unlimited water; its urine quickly became acid: another rabbit was fed on an ordinary diet containing plenty of green food, and passed strongly alkaline urine. Each was given about 10 cc. of a strong haemoglobin solution. The first rabbit passed the haemoglobin out as a brown precipitate suspended in an acid urine containing numerous brown granular casts, and its blood urea rose to 78 mgm. per 100 cc.; the second passed red alkaline urine containing abundant oxyhaemoglobin and no brown precipitate or casts, and its blood urea remained normal, i.e., 35 mgm. per 100 cc. Later experiments showed that not only increased acidity but increased salt concentration was concerned in the precipitation of haemoglobin, but high salt concentration without the required degree of acidity produced no precipitation of the haemoglobin. Further experiments showed that a return to a diet containing green food aids in the recovery of renal function after temporary blockage of the tubules caused by haemoglobin injections.

Spectroscopic examination proved that the brown pigment in acid urines was mainly methaemoglobin and that in the red specimens of alkaline urine the bands of oxyhaemoglobin predominated. The paper closes with a discussion on the relation between the hydrogen ion concentration of the medium and the nature of the pigment formed.

The following summary is given :—

" 1. Two cases of intra-renal obstruction caused through blood transfusion are described and compared with the intra-renal obstruction of blackwater fever.

" 2. A method for the preparation of strong haemoglobin solutions suitable for injecting into rabbits is described.

" 3. The urine passed by rabbits after injection of haemoglobin is found to be either (*a*) red, alkaline in reaction and showing the bands of oxyhaemoglobin ; or (*b*) brown, acid in reaction, with a brownish deposit in the form of granular casts and amorphous *débris*.

" 4. Rabbits on an ordinary diet and passing an alkaline urine are unaffected by haemoglobin injections, but if the urine is kept acid by means of a suitable diet an intra-renal obstruction can be produced.

" 5. A series of *in vitro* experiments prove that haemoglobin is thrown out of solution when (*a*) the reaction of the medium is not more than about pH 6, and (*b*) the NaCl content is about 1 per cent. or over.

" 6. From these experiments it would appear that haemoglobin is excreted in solution in the glomerular transudate. After concentration in the tubules the acidity and the salt concentration increase, with the result that the pigment is precipitated, probably in the form of haematin.

" 7. This theory would explain the production of intra-renal obstruction in cases of the type described and in blackwater fever.

" 8. A suggestion for the treatment of these conditions, based on the above conclusions, is offered, namely, the production of alkaline diuresis."

W. Y.

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ASBELEW (W. N.). Zur Frage des Zusammenwirkens lipoider Substanzen mit Chinin und ihrer hämatoxischen Wirkung in Verbindung zur Hämoglobinuriepathogenese. [**On the Question of the Combined Action of Lipoid Substances and Quinine, and their Haemotoxic Action in Combination, in the Pathogenesis of Haemoglobinuria.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Apr. 8. Vol. 47. No. 1. pp. 89–96. [4 refs.]

The following summary is given :—

1. Lipoid substances cannot activate the haemolytic action of quinine *in vivo*. Lecithin influences quinine haemolysis *in vitro* only so far as it is itself haemolytic and acts on serum free corpuscles.

2. In the blood serum no substances have so far been demonstrated which can serve as activators in quinine haemolysis. The observations on this subject made by Kritschewsky *in vitro* with quinine concentration of ·25 to ·4 per cent. are probably to be attributed to physical changes in the medium following the action of the quinine on the serum protein.

3. The view that haemoglobinuria in malaria is a combined action of quinine with the lipoid substances of the organism, finds no support from the author's *in vitro* experiments.

4. The blood serum in the acute stages of malaria has in the majority of cases an antihaemolytic power.

5. Quinine treatment is no contraindication for the intravenous lecithin treatment.

W. Y.

LE DANTEC (A.). Note sur un cas d'accès bilieux hémoglobinurique accompagné de syndrome de Raynaud. [**Haemoglobinuria accompanied by Raynaud's Syndrome.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 680–686.

Details are given of a patient, aged 31, who on his tenth voyage to West Africa, had two attacks of bilious haemoglobinuria accompanied by the syndrome of Raynaud. The patient had never taken prophylactic quinine, and on the previous voyage had suffered from two attacks of tropical malaria. On January 17th, 1926, he noticed that his fingers had suddenly become benumbed, and consequently went to the ship's surgeon, who found albuminuria and ordered rest and two doses of ·25 gm. of quinine daily. The next day the urine was black, but there was no fever, and the fingers were gradually losing their numbness. The quinine was continued and the symptoms subsided, so that by January 21st the urine was clear and the fingers normal. On February 26th, i.e., 40 days after the first attack, he again experienced numbness of the fingers and was excused his work ; at mid-day, without having had any drug, the urine was found to be black. No drug was given—the patient simply resting and taking milk diet—and on March 1st, when the vessel arrived at Bordeaux, the patient came under the care of the author. The fingers and ears were pale and cold whilst the palms and soles were of normal temperature ; the urine was black, there was bilious vomiting, the conjunctivae were slightly icteric, the radial pulse was small and frequent, the expression was anxious, and the temperature was normal. The liver and spleen were slightly enlarged. Calcium chloride and hot drinks were given, and hot water bottles were applied to the feet ; the symptoms gradually disappeared, and the next day the urine was normal.

Examination of the blood was negative, neither malaria parasites nor spirochaetes being found ; the leucocyte formula was normal ; the Wassermann reaction performed on five occasions was always positive and remained so even after a course of arsenobenzol. Inoculation of 10 cc. of the blood into a guineapig was without result. The patient denied venereal disease, and medical examination failed to reveal any evidence of syphilis, acquired or hereditary.

The interesting observation was made that the blood of the patient laked in a pipette, previous cooling of the finger or shed blood being unnecessary to provoke the phenomenon. This red cell fragility persisted for 2 or 3 months after the attack and then gradually disappeared.

W. Y.

REPETTO (R.). Sur le traitement de l'hémoglobinurie. [**Treatment of Haemoglobinuria.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. July. Vol. 6. No. 2. pp. 161–164.

The author states that on his arrival in the Congo in 1910, he was given very contradictory advice on the question of the desirability of giving quinine in cases of blackwater fever. The first three cases of the disease which came under his care at Lokandu he treated with subcutaneous injections of normal saline without any quinine ; all recovered. Encouraged by these results he treated successfully three other very severe cases at Lisala. Later, at Boma, he treated six patients with intravenous injections of phosphated physiological saline, one of whom died.

From 1921 to 1923, he treated six cases with collobiase of arsenic and quinine, given intravenously, according to the method of Letuile-Roux, combining this in the severe cases with the intravenous injections of phosphated physiological saline ; all these cases recovered.

The author contrasts these results with those of ZERBINI at Katanga, who treated his cases with injections of quinine in doses of 1 to 1·5 grains (of the 28 cases so treated six died) ; and concludes [in the reviewer's opinion without any justification] that there is some peculiar virtue in the collobiase of arsenic and quinine.

W. Y.

TARDIF. Cinq observations de fièvre bilieuse hémoglobinurique traitée par la méthode de Boyé (sérum antivenimeux). Note du Médecin Inspecteur Boyé. [**Five Cases of Blackwater Fever treated by Antivenomous Serum.**]—*Ann. Méd. et Pharm. Colon.* 1926. Apr. May-June. Vol. 24. No. 2. pp. 219–226.

Blackwater fever is not common in Gabon and is met with particularly in the so-called dry season, which lasts from May till October, when the temperature is relatively low. Details are given of five cases treated by the method of Boyé with antivenom serum. All recovered, but four of them suffered from relapses about the seventh day.

W. Y.

BURKITT (R. W.). **Treatment of Blackwater Fever.**—*Kenya Med. Jl.* 1926. June. Vol. 3. No. 3. pp. 89–90.

The author states that there are two outstanding things to be done in the treatment of blackwater fever :—

> " 1. Do away with the product of malaria saturation, viz. acidosis. Where this is done thoroughly the haemoglobinuria ceases.
> " 2. Do away with the primary cause, viz. malaria."

He states that when possible sodium bicarbonate should always be given intramuscularly, and that when this is done, the haemoglobinuria will soon cease. He further considers that the tincture of cinchona bark might, with advantage, be given at first instead of quinine, and will be less likely to produce a relapse of blackwater.

W. Y.

HANSCHELL (H. M.). **Intravenous Alkaline Infusion in Blackwater Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Feb. 18. Vol. 19. No. 8. pp. 488–491. [2 refs.]

This paper records a case of blackwater fever treated successfully by intravenous administration of sodium bicarbonate. The author writes :—

> " Modesty, and caution bred of some knowledge of this disease, would usually prevent one such case being thought worthy of record ; and, most of all, any claim for the specific efficacy of a drug used in one case only. Indeed, but for some recent work of Baker and Dodds (October, 1925), the writer was resigned to the thought that he had put in an ineffectual attendance on yet another sick human being, doomed from the start to recovery."

Details of the case are briefly as follows :—

European male, aged 47 years, had recently returned from West Africa, where he had had many attacks of fever, notwithstanding the fact (so he stated) that he had taken 5 grains of quinine daily. The author treated him for syphilis over a period of nine months, and half way through this course the patient developed fever, *P. falciparum* being found in the blood. Three months after cessation of anti-syphilitic treatment the author was called in to see the patient in his lodgings. He had then been ill for 2½ days without medical attention ; he had diagnosed his own case as blackwater fever, and had remained in bed and treated himself by frequent liberal draughts of beer. On examination he was found to have deep jaundice, an anxious face, pulsating neck, large liver and spleen, small rapid pulse, indistinct heart sounds, and haemic murmurs. The temperature was 103·4° F. Vomiting had begun eight hours previously and was now frequent. No urine had been voided for over five hours, the whole of the last specimen measured just over one fluid ounce, which was almost black with a heavy brown granular deposit. The patient complained of severe headache and lumbar pain and had fainted on sitting up in bed about two hours before the author arrived. Two hours later the patient was unable to talk or move, the vomiting had ceased, the temperature was 104·4° F. and no urine had been passed ; a catheter drew off about half an ounce of black urine with a heavy granular deposit consisting of granular and cellular casts, epithelium cells, a few leucocytes and red cells and much yellowish granular débris.

The patient was given intravenously 20 fluid ounces of distilled water in which had been dissolved 150 grains of sodium bicarbonate. Noticeable improvement in the pulse followed and the injection was repeated one hour later. About fifteen minutes after the second injecoisn the catheter drew off about four ounces of urine less black and with less deposit, and the patient's general condition had unmistakably improved. Yet an hour later, the catheter drew off some 12 ounces of translucent red urine with a little deposit, and the patient, after a few moments of shallow sighing, yawned and fell asleep. Diuresis with progressively clear urine continued and convalescence followed rapidly.

W. Y.

BRAIMBRIDGE (C. V.). **Decapsulisation of the Kidney in Blackwater Fever.**—*Kenya Med. Jl.* 1926. Dec. Vol. 3. No. 9. p. 267.

Decapsulization of both kidneys was performed in a patient with blackwater fever who had exhibited complete suppression of urine for three days. There was a certain amount of urinary secretion during the following 24 hours, but suppression returned and the patient eventually died.

W. Y.

TWELLS (T. W.). **A Case of Blackwater Fever.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. p. 268. With 1 chart.

Details are given of a case of blackwater fever, in a European aged 25 who had lived for more than six years in India and previously had never had malaria and had never taken quinine. When first seen by the author the patient was passing blackwater and his blood contained *P. falciparum.*

Three days later, as parasites were still present, quinine, grains 2, were given daily and the dose was gradually increased to 20 grains daily. The patient made an uninterrupted recovery.

W. Y.

CARDAMATIS (Jean P.). La fièvre bilieuse hémoglobinurique observée en Grèce. [**Blackwater Fever in Greece.**]—*Grèce Méd.* 1926. Mar.-Apr. Vol. 28. No. 3–4. pp. 9–14. [21 refs.]

This article consists of a general account of blackwater fever and requires no special notice.

WEITZMAN (T.). **Note of a Case of Blackwater Fever in a Native of Palestine.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. p. 274.

This note contains a brief description of a case of blackwater fever occurring in a Bedouin near Chedera, Palestine. The author considers it of some interest in view of the fact that it is generally accepted in Palestine that blackwater fever does not occur in natives.

WALLINGTON (K. T. K.). **Two Cases of Blackwater Fever occurring within Ten Days at Broderick Falls, Uganda Extension Railway Construction.**—*Kenya Med. Jl.* 1927. Mar. Vol. 3. No. 12. pp. 357–359.

Clinical details are given of two cases of blackwater fever, one followed by death and the other by recovery.

ANDERSON (James S.). **Blackwater Fever in Scotland.**—*Lancet.* 1927. Jan. 1. pp. 18–19.

This is a note concerning an attack of blackwater fever in a patient who had four months previously been in West Africa.

KRITSCHEWSKY (I. L.). Zur Hämoglobinuriepathogenese bei Malaria. [**The Pathogenesis of Haemoglobinuria in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. July 1. Vol. 30. No. 7. pp. 293–294. [4 refs.]

This is a rejoinder to KESSLER who, so Kritschewsky complains, misquoted him when commenting on his paper on the pathogenesis of blackwater fever. (This *Bulletin*, Vol. 21, p. 386, and Vol. 23, p. 69).

PLEHN (Albert). Demonstrationen und Erläuterungen zur Schwarzwasserfrage. [**Demonstrations and Explanations on the Blackwater Fever Problem.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 56–61. With 4 text figs. [1 ref.]

The matter contained in this address has already been discussed in a previous paper, which has been fully summarized and the subject of a critical review in this *Bulletin* [Vol. 17, p. 313 and Vol. 19, p. 631]. W. Y.

COSIMO (Basile Vito). A proposito di un caso di febbre biliosa-emoglobinurica. [**A Case of Bilious Haemoglobinuric Fever.**]—*Ann. di Med. Nav. e Colon.* 1927. Mar.–Apr. Year 33 (Year 5). Vol. 1. No. 3–4. pp. 168–175. With 1 chart in text.

A typical case of blackwater occurring in a malarial subject after a large dose of quinine, 3 gm. of the hydrochloride " intravenously and by mouth " in 24 hours.

H. Harold Scott.

## MISCELLANEOUS.

COOLEY (Thomas B.) & LEE (Pearl). **The Sickle Cell Phenomenon.**—*Amer. Jl. Dis. Children.* 1926. Sept. Vol. 32. No. 3. pp. 334–340. With 3 text figs. [4 refs.]

The observations here reported were made in the Children's Hospital of Michigan, where for ten months the blood of all the negro children admitted was examined for sickle cells, and, so far as was possible, the blood of the relatives of the affected children also. The authors confirm the statements that sickle-cell anaemia is congenital and hereditary, and believe that transmission may be through the mother. They conclude from their observations that the mere presence of sickle cells in the blood does not necessarily imply anaemia or, indeed, any deviation from the normal standard of health, although the sickle-cells disappear rapidly when the blood is incubated, and although their presence is sometimes associated with haemolytic jaundice. The authors are disposed therefore to draw a line between the two alternatives and to restrict the term " sickle-cell anaemia " to the cases where sickle cells and haemolytic jaundice are concurrent phenomena.

The following is the summary of their observations :—

" Of 400 coloured patients in the Children's Hospital, 30, or 7·5 per cent., were found to have sickle cells. Of the parents of the 30 children, 15 mothers and 6 fathers were examined ; 11 mothers and 1 father showed sickle cells, and in this one case the mother also showed them. With two exceptions, none of the children showed an anemia differing in any way from the average of a corresponding number of children without sickle cells. There was no history of anemic symptoms, nor of jaundice, in the children or their families, and no signs or history of leg ulcers ; nor can we find that leg ulcers of the type described occur in the coloured population at large. Yellow sclerae are not observed. Roentgenograms show nothing characteristic in the skull and long bones. Necropsies on three out of four children who died gave no significant findings. Two children have shown a mild grade of hemolytic jaundice. They had greenish-yellow sclerae, pigmented blood serum, positive indirect van den Bergh reaction, and increased urobilin. Gastric hydrochloric acid was diminished in one, and absent in the other. There were leukocytosis and moderate anemia with normoblasts, polychromatophilia and reticulation. The spleens were not enlarged, and no gland swellings were noted. There were no ulcers nor scars. Roentgenograms of the skull and long bones in one gave slight indication of changes like those we have noted in another form of chronic hemolytic anemia. Clinically, these two cases have nothing to suggest a separate disease entity.

" Our studies of the phenomena of sickling confirm, in general, those of other observers. We have two new facts to add : (1) In preparations kept at incubator temperature, the sickle cells disappear rapidly from the blood, leaving the round cells behind ; (2) the cells of one of the patients with hemolytic anemia are rapidly hemolyzed at incubator temperature in their own serums and in serums from normal bloods, while the serum of this patient is not hemolytic for normal cells. This test has not yet been applied to any number of sickle cell bloods. These two observations seem to imply a special vulnerability of the sickle cell."

The authors commend the subject, and particularly its congenital (and possibly tribal) aspects to the attention of medical men in Africa.

A. A.

LEE (Douglas H. K.). **Blood Groups of North Queensland Aborigines, with a Statistical Collection of some Published Figures for Various Races.**—*Med. Jl. Australia.* 1926. Sept. 25. 13th Year. Vol. 2. No. 13. pp. 401–410. With 3 figs. [22 refs.]

This important paper is the outcome of a survey of 377 Australian aborigines of Palm Island Settlement, about 40 miles N.N.E. of Townsville (Queensland). In the first part of the paper the author describes his methods and technique and his results; in the second part he discusses, on a wealth of statistical detail, the geographical variation of the racial or biochemical index.

The author's 377 aborigines were, to all possible assurance, pure stock. Their bloods were sorted, according to the method of Moss, as follows: Group I, 60·3 per cent.; Group II, 31·7 per cent.; Group III, 6·4 per cent.; Group IV, 1·6 per cent.; giving a biochemical race-index of 4·2. This determination does not actually coincide with the determinations of other authors in other Australian areas, but it agrees with them in being high in the world series.

Dealing with the geographical undulation of the biochemical race-index the author remarks upon the existence of certain gaps in the statistical requirements, namely, for South American natives, Maoris, Fijians, South African Bushmen, Norwegians, Swedes, and Eskimos. Taking the data as they exist at present the author uses them graphically. From his map " it will be seen that India forms the centre of a cone-like depression with an index of 0·56 and that as we pass out from it the figures for the most part show a steady gradient, but more especially to the east and west, until the extremes of 5·35 in north-west Europe and 5·7 in Australia and 9·2 in North America are reached." The author thinks that the explanation of this geographical conformation is not to be found in racial adaptations to " geographical " factors, but may perhaps be sought in connexion with the place of origin and subsequent migrations of Man.

A. A.

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PROESCHER (Frederic) & ARKUSH (Albert S.). **Acetone Methylene Blue—Methylene Azur Eosin Solution for Staining Blood Smears.**—*Jl. Lab. & Clin. Med.* 1926. Apr. Vol. 11. No. 7. pp. 682–683.

The following stain is said to be very similar in effect, while comparing " very favourably," with the commonly used eosine-methylene-blue stains.

Equal parts (about 60 mgm. each) of methylene blue (Merk), thiazin red (methylene azur), and eosin are mixed with 25 cc. of water, and 50 cc. of acetone then added. The acetone should be C.P. (Toluidin blue may be used instead of methylene blue. Grübler's eosin (extra BA) is much preferable to the domestic eosin). By substituting orange G for part (about one-third) of the eosin, eosinophile granules become slightly more prominent. The proper intervals for the stain should be determined by trial each time it is made up, and care then taken that the acetone does not evaporate. The advantages of this stain are said to be its rapidity, easy preparation and economy, and its not requiring a buffer for dilution or washing.

A. A.

SULDEY (E. W.). Méthode de coloration rapide pour recherches hématologiques. [**Rapid Blood Stain.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 723–724.

The technique is as follows :—

(1) Prepare—1 per cent. toluidine blue 10 ; neutral distilled water 40 ; 95 per cent. alcohol 10 to 15. (2) Use dry films, unfixed. (3) Stain. (4) Drain. (5) Repeat the staining. (6) Dry gently with paper. (7) Examine without coverglass under an oil immersion lens, applying the cedar oil to the film just as the moisture is disappearing.

Metachromasia, endo- and extra-corpuscular parasites are well brought out.

W. F. H.

MORGAN (Julia). **Notes on Stovarsol Poisoning.**—*China Med. Jl.* 1926. Nov. Vol. 40. No. 11. pp. 1086–1090. [14 refs.]

The author notes that stovarsol (acetyl aminophenyl-arsenic acid) contains 27 per cent. arsenic and is as a rule well tolerated. The majority of writers recommend an adult dose of 0·5 to 1·0 gm. daily for a week or more, with repetition if necessary after a few days. The practice of a number of authors is described. A few cases of poisoning have been reported, with one exception extremely mild. The author records three cases of poisoning, two severe and one mild, among eight patients treated at Tsinanfu. The dosage followed was as above, 0·25 gm. being given thrice daily, but after 2 cases of poisoning had occurred the frequency was reduced to twice ; the most severe symptoms appeared after administration of 2·0 gm. Full details are given. The cases were dysentery, amoebic in two instances. In each case fever (up to 105°) was the first symptom, followed two days later by rash and bronchitis. The rash appeared all over the body, or spared the legs and face, and is described as " a diffuse roseolar macular dermatitis," and in the other cases as " morbilliform " and " reddish maculopapular." Sodium thiosulphate was given in two instances. It is suggested that careful temperature records should be kept and the administration suspended if the temperature rises.

In discussion D. MELENY said there had been three cases of stovarsol poisoning at Peking, one fatal.

A. G. B.

NAPIER (L. Everard). **Reactions following the Administration of the Pentavalent Compounds of Antimony : an Analysis of Cases reported by Several Correspondents.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. pp. 559–561.

In the course of a year the author at Calcutta has received reports on reactions following the administration of pentavalent compounds of antimony in 13 cases ; he gives brief details of each. In 8 ureastibamine (Brahmachari) was the compound used, in 3 stiburea (Union Drug Co.) and in 2 amino-stiburea ; the symptoms could not be grouped according to the compound used. In most cases they appeared after one of the later injections, from the 6th to the 17th. In most cases again it was the maximum dose that caused the first symptoms, but the maximum dose had usually been administered already without such an event. The symptoms appeared very shortly after the injection and usually in the following order :—

"The patient had a burning sensation all over the body ; the eyes became puffy and there was swelling of the face ; an urticarial rash appeared on the face and all over the body ; there was a sensation of suffocation, apparently caused by oedema of the mucous membrane of the throat, which was in some instances followed by loss of voice and in others by severe dyspnoea ; in a few instances there was a marked rise of temperature and pulse rate, but in the most severe cases there was collapse and vomiting ; and in one instance the patient passed into a semi-conscious state."

"The symptoms usually disappeared rapidly, but in a few the swelling of the face persisted for 24 hours."

In two cases a severe shivering attack lasting for about 2 hours was the main phenomenon.

The author discusses the symptoms and finds they suggest anaphylaxis with sensitization by the previous injections. They were not due to overdose nor to antimony poisoning. In none was the issue fatal, and no one need hesitate about using these preparations. "The great decrease in the death rate amongst treated cases [kala azar] that has been effected since the pentavalent compounds were introduced is an irrefutable argument in favour of adopting these in the place of sodium antimony tartrate whenever possible."

The attack may be cut short by adrenalin and recovery accelerated by strychnine and digitalin. Great caution should be used in the subsequent injections, which should not amount to more than one tenth of that which caused the symptoms.

A. G. B.

CARMAN (J. A.). **A Case of Idiosyncrasy for Carbon Tetrachloride.**—
*Kenya Med. Jl.* 1926. Dec. Vol. 3. No. 9. pp. 260–261.

Seventy boys were treated for hookworm in batches of 10 with carbon tetrachloride and magnesium sulphate. The first batch received 2 cc. of $CCl_4$, and the next five batches 3 cc. [33 cc. in text] with no signs of poisoning. The last batch had 4 cc. followed immediately by magnesium sulphate. One of these boys half an hour later complained of a sensation of giddiness and within two minutes lay down and became incapable of speech, with shallow respiration and thready pulse ; unconsciousness rapidly followed. Whisky and strychnine were administered without effect and the breathing stopped. Artificial respiration was commenced and continued for 10 minutes, when the patient sat up. "His behaviour was that of a patient recovering from an anaesthetic." The next day he complained of pain over the liver and was unsteady on his feet. The purgative had acted, it is stated, before the onset of symptoms.

The conclusions drawn are that 3 cc. is the largest safe dose of the drug, that if symptoms of poisoning appear deep breathing should be commenced or, if the patient is unconscious, artificial respiration, and that ether, for its effect on the respiratory centre, would be the best stimulant to administer hypodermically.

A. G. B.

LAMSON (Paul D.) & WING (Raymond). **Blood Fibrin and Levulose Tolerance in Acute and Chronic Carbon Tetrachloride Intoxication.** —*Jl. Pharm. & Experim. Therap.* 1926. Sept. Vol. 28. No. 3. pp. 399–408. With 2 text figs. [11 refs.]

The following are the conclusions of this paper; the subjects were dogs:—

" 1. A certain threshold dose of carbon tetrachloride by mouth, approximately 0·25 cc. per kilo, is necessary to produce a fall in blood fibrin. Larger doses (up to 6 cc. per kilo) cause no greater fall.

" 2. Maximum oral doses of alcohol alone produce no change in blood fibrin.

" 3. The simultaneous administration of alcohol and carbon tetrachloride does not reduce the threshold dose necessary to produce a fall in blood fibrin.

" 4. Carbon tetrachloride administered orally in a single dose reduces levulose tolerance, the maximum disturbance occurring about three days after administration and normal tolerance being re-established in five or six days.

" 5. A single dose of carbon tetrachloride produces in forty-eight hours a striking derangement of certain liver functions as shown by an increase in bile pigments in the blood, a reduced tolerance to levulose, a drop in the blood fibrin, and a disturbance of the phenoltetrachlorphthalein liver function test. Dogs chronically poisoned with large doses (10 to 25 cc.) of carbon tetrachloride given every other day for a period of approximately four months and showing tremendous liver lesions of necrosis, scar tissue formation, and all the signs of an early cirrhosis of the liver, *give normal values for all of these liver function tests.* It has been found that under the continued administration of carbon tetrachloride the blood fibrin returns to normal in two weeks in spite of the very active liver lesions found.

" 6. Specific threshold oral doses of carbon tetrachloride are necessary to produce a change in the different liver functions examined. These threshold doses for the different functions are approximately 0·25 cc. per kilo to cause a decrease in blood fibrin, 0·5 to 1·0 cc. per kilo to cause pathological change, and 4·0 cc. per kilo to cause a retention of the dye, phenoltetrachlorphthalein. Larger doses than this cause no greater disturbance in function in the case of pathological change and blood fibrin. The other functions are being examined for this " all-or-none " property."

A. G. B.

i. LOEVENHART (A. S.) & STRATMAN-THOMAS (W. K.). **On the Chemotherapy of Neurosyphilis and Trypanosomiasis.**—*Jl. Pharm. & Experim. Therap.* 1926. Oct. Vol. 29. No. 1. pp. 69–82. [40 refs.]

ii. FOURNEAU (E.), TRÉFOUËL, M. & Mme., & DE LESTRANGE-TRÉVISE. Les dérivés de l'acide phénylarsinique (arsenic pentavalent) dans le traitement des trypanosomiases. Relation entre l'action thérapeutique des acides arsiniques aromatiques et leur constitution. (Deuxième mémoire.) **[Derivatives of Phenylarsinic Acid in the Treatment of Trypanosomiasis. The Therapeutic Action of Aromatic Arsinic Acids in relation to their Constitution.]**—*Ann. Inst. Pasteur.* 1926. Nov. Vol. 40. No. 11. pp. 933–951. [14 refs.]

i. After a comparative study of twelve arsenical drugs the authors conclude that tryparsamide is the only drug of the series which can be regarded as effective in neurosyphilis. Examination of the chemical structure of these twelve drugs leads them to the conclusion that the therapeutic effect peculiar to tryparsamide, $(HO)_2$:AsO.$C_6H_4$.NH.$CH_2$.CO.$NH_2$, is associated with the structure to the left of the .CO. group and in this structure the methylene group (.$CH_2$) is regarded as important. The conversion of tryparsamide into the corresponding acid (.CO.$NH_2$COOH) or ethyl ester (.CO.$NH_2$CO.O$C_2H_5$) destroys the activity, whilst transformation into the related primary alcohol (.CO.$NH_2CH_2$OH) gives a substance "etharsanol," which is an effective trypanocide and spirochaeticide in man and animals, but is devoid of the action of tryparsamide in neurosyphilis. The authors suggest that the value of drugs in late trypanosomiasis in rabbits, after apparent involvement of the central nervous system, is no criterion of their value in neurosyphilis.

Apart from the foregoing, which narrows but does not solve the main question, it is shown that there is no significant difference in the amounts of arsenic secreted by the gray and white matter of the brain when tryparsamide and neosalvarsan are injected intravenously, so that the suggestion made by BROWN and PEARCE (this *Bulletin*, Vol. 21, p. 378) that the action of the former drug in neurosyphilis is due to its greater penetrating power is untenable. The authors are therefore driven to the conclusion that the action of tryparsamide in neurosyphilis is mainly indirect and that when it is ineffective deterioration in the cells concerned must have proceeded so far that they no longer respond to stimulation by the drug.

ii. This is a further contribution to the study of the effect on trypanocidal action of the substitution of various radicals for hydrogen atoms in the nucleus of phenylarsinic acids (compare this *Bulletin*, Vol. 21, p. 322).

The chemistry of each of the compounds dealt with is described briefly, full details being reserved for publication elsewhere, and for each the tolerated and curative doses are given. The following paragraphs summarize the general results of the various substitutions as they affect the chemotherapeutic index. The insertion of a methyl group in disubstituted phenylarsinic acids has an unfavourable effect, except in the case of 3 : 4-diaminophenylarsinic acid where the 6-methyl-derivative has a definite trypanocidal effect, that of the parent substance being irregular and indeterminate. Introduction of a chlorine atom generally raises the toxicity and slightly lowers the curative dose but in general the index remains below that of the non-chlorinated product. The exceptions are 3-amino-6-chlorophenylarsinic acid and the 2-chloro derivative of tryparsamide, where the index (T/C) is raised from 0 to 1, and 3 to 5 respectively.

In the aminophenylarsinic acids neutralization of the amino-group by acylation, in general augments the index, when the amino-group is in the *para*-position to the arsenic radical. Further the acylamino-compounds are more active when given by the mouth than when injected subcutaneously, at least in mice infected with "nagana." Conversion of the amino-group into an acylamino- or a urethane group in the case of 3-amino-4-hydroxyphenylarsinic acid destroys all trypanocidal action, but its neutralization by a dimethylaminoacetyl group as in $(HO)_2$:AsO.$C_6H_3$OH.NH.CO.$CH_2$.N$(CH_3)_2$ only lowers the index T/C from 5 to 2. While 2:4-dihydroxyphenylarsinic acid has an index of 2·5, the 5-amino- derivative is devoid of action, showing that the amino- group, *per se*, has no specific influence. The whole series emphasizes the importance of the amino-group in the 4 or *para*-

position to the arsenic radical; thus tryparsamide and its two isomerides with the glycineamide group in the ortho and *meta*- positions respectively have indexes (T/C) 3, 0, and 1. The nine possible position isomerides of 3-amino-4-hydroxyphenylarsinic acid (the parent substance of the drugs variously known as stovarsol, spirocide, acetylarsan, etc.) have now all been prepared: the only other promising member of the group is 4-amino-2-hydroxyphenylarsinic acid and this has proved to be less effective than stovarsol in the treatment of syphilis. Particular interest attaches to the influence of the acetyl residue ($CH_3.CO.$), attached to a cyclic carbon in phenylarsinic acids, since the acetophenone grouping is characteristic of "Albert 102," the precise structure of which has not been published: 4-acetophenonearsinic acid, $(HO)_2{:}AsO.\ C_6H_4.CO.CH_3$, has T/C=2, i.e., it is more active than atoxyl, though it possesses neither an amino- nor a phenolic hydroxyl group.

T. A. Henry.

KÉRUZORÉ (A.). L'altération de l'atoxyl. **[Deterioration of Atoxyl.]**—*Ann. de Méd. et de Pharm. Colon.* 1926. Apr.–May–June. Vol. 24. No. 2. pp. 186–190.

A number of poisoning cases having been traced to the use of deteriorated atoxyl in the treatment of sleeping sickness, the author has devised a method of detecting such deterioration, based on the observation of FRANCOIS that atoxyl has been known to decompose on long storage into sodium arsenate and arsenious oxide. The process depends on the detection of the former in the usual way as ammonium magnesium arsenate or as the yellow precipitate formed on addition of ammonium molybdate dissolved in sulphuric and nitric acids.

T. A. Henry.

MCCARRISON (Robert). **A Note on Lathyrism in the Gilgit Agency.**—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 379–381. With 1 plate. [3 refs.]

The author publishes an old and interesting note dated 1908, moved thereto by the papers of ACTON & CHOPRA, and ANDERSON, HOWARD and SIMONSEN [this *Bulletin*, Vol. 20, pp. 46 and 645; Vol. 22, p. 985].

Ten cases of lathyrism developed in a village of 101 inhabitants, 5,500 feet above sea level. These were recent settlers and the soil was very unproductive. The main crop was "garash" or *Lathyrus sativus*; the grain is ground with a small proportion of wheat (1 to 50 in one sample) and made into bread; the villagers had lived on this for six months. Of the 10 all were males and 6 were boys. The symptoms developed after 2, 3, 4 and 5 months. The disease had reached the stage of spastic paralysis, and 7 were unable to walk without a stick. A chemical test showed that four ounces of Lathyrus seed contained an alkaloid. A feeding experiment on a monkey was inconclusive.

Colonel McCarrison draws attention to the fine physique of one of the sufferers (illustrated) indicating that the cause is a poison rather than a nutritional defect. He notes from his experience with millet seed grown under various manurial conditions that "garash" may be toxic under certain conditions of growth and not otherwise, but states that the seeds may not have been pure *L. sativus*.

A. G. B.

IYER (A. S. Vaidyanath). **Infantile Cirrhosis of the Liver. (Its Causation and Treatment; from a Study of 59 Cases.)**—*Indian Med. Gaz.* 1926. Dec. Vol. 61. No. 12. pp. 594–596.

In a period of 4 years the author, Assistant Surgeon, Tellicherry, Madras, has treated 59 cases of infantile cirrhosis. Of these 57 were between the ages of 6 months and 3 years; the children came from both vegetarian and non-vegetarian families. In half the cases the spleen was enlarged as well as the liver. The large majority were on a mixed diet of breast-milk, cow's milk, rice and sago, and faulty digestion was believed to be the cause. Thus, a strict diet of easily digestible food soon brought amelioration, whereas the addition of rice aggravated the symptoms. The author gives goat's milk, roasted ripe bananas, fruit juices and as a rule Horlick's malted milk. All starchy foods are avoided. The administration of grey powder proved useful. Nearly half the patients recovered.

A. G. B.

KHAN (Matlook). **A Cheap and Waterproof Substitute for Plaster-of-Paris in Outpost Dispensaries.**—*Indian Med. Gaz.* 1926. Nov. Vol. 61. No. 11. p. 551.

Black gram is soaked in water for 12 hours, the pericarp is rubbed away, and the white seeds are made into a paste. This is applied to one side of a soaked bandage and after each turn finely powdered building cement is rubbed in, with a final coat of paste and cement.

A. G. B.

CASTELLANI (Aldo) & TAYLOR (F. E.). **Further Observations on a Mycological Method to identify Various Sugars and other Carbon Compounds.**—*Jl. Trop. Med. & Hyg.* 1926. July 15. Vol. 29. No. 14. pp. 201–210. With 1 text fig. [11 refs.]

It is stated that the fermentation test for glucose by means of baker's yeast as described in many manuals of pathology and clinical methods is not specific, as usually the yeast is impure; and, even with pure cultures, levulose, galactose and saccharose may be fermented in addition to glucose. *Monilia krusei* Cast. produces acid and gas in glucose and levulose only, and for practical purpose is preferable to baker's yeast. The authors then elaborate this method for the identification of other sugars and carbon compounds, by adopting various combinations of fungi, of fungi and bacteria, or of chemical tests and fermentation tests. Numerous examples are described, and the method is regarded as being especially valuable for the identification of galactose and maltose.

P. Tate.

i. BARRETO (Francisco). Contribuição ao estudo do valor diagnostico da Reacção de Gaté e Papacostas e suas aliadas. [**The Diagnostic Value of the Gaté and Papacostas and Allied Reactions.**]—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. pp. 49–82. [French summary pp. 83–85.]

ii. DE MELLO (Froilano). Note complémentaire sur quelques faits concernant le phénomène de formol gélification. [**Supplementary Note on the Formol-Gel Reaction.**]—*Ibid.* pp. 86–98.

i. In this detailed and documented work the author has tested the value for diagnosis of (1) Gaté and Papacostas' reaction in which two drops of 40 per cent. formol are added to 1 cc. of human serum, (2) Napier's modification in which one drop of a 10 per cent. solution of phenol is added as well, (3) the first, in which the serum is inactivated at 55°, (4) Ray's globulin test, the grade of flocculation obtained when distilled water is added to serum. He employed 61 serums from normal persons, 40 from malaria patients, 30 from syphilitics, 4 tuberculosis, 6 leprosy, 6 pregnancy, and 54 from miscellaneous diseases.

The conclusions reached were :—

(1) The Gaté and Papacostas reaction does not seem to have any diagnostic value, since we have found it not only in syphilis, tuberculosis and leprosy, but also in other diseases and even in normal persons.

(2) Napier's reaction does not seem to have the high diagnostic value which its author attributed to it since the opacity has been seen in our observations in malaria, syphilis, leprosy, tuberculosis, amoebic dysentery and other diseases.

(3) Ray's reaction does not seem of diagnostic value since we have found it positive even in normal serums.

(4) Inactivation seems to hasten the phenomenon of formol gelification.

(5) Phenol seems to retard it to a certain extent.

ii. Professor Froilano de Mello has repeated the work of his pupil, BARRETO, employing 9 serums from normal persons, 5 tuberculosis, 5 syphilis, 11 malaria and 10 various skin conditions and has confirmed the work of BARRETO. He then tested the same patient on more than one occasion and afterwards a series of patients daily for a week. He found that negative reactions later became positive and that the degree of opacity increased with the quantity of formol added. He concludes that the formol-gel reaction and its modifications present such variations that they cannot be employed for the diagnosis of disease.

A. G. B.

SISON (A. G.), SISON (A. B. M.), IGNACIO (M.) & NAVARRO (R.). **Splenic Anemia among Filipinos.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 271–275; also in *Jl. Philippine Islands Med. Assoc.* 1926. Oct. Vol. 6. No. 10. pp. 330–332.

The authors examined the records of all admissions to the Philippine General Hospital for a period of 13 years and also the autopsy records for the same period. Fifty admissions, or 0·2 per cent., were diagnosed clinically as splenic anaemia or Banti's disease. Of 20,000 autopsies, made during the same period, in 24 the same condition was recognized. Of the 50 cases 38 were between 20 and 40 years ; 14 suffered also from tuberculosis of the lungs and 10 from nephritis ; in 22 there was a history of malaria. A record is furnished of the intestinal parasites found in the 50. All had a large spleen, 80 per cent. had fever, 58 pallor, 56 per cent. had enlarged liver, and 46 and 40 per cent. ascites and jaundice. The blood counts showed a moderate degree of anaemia of the secondary type with a tendency to leucopenia. An account is given of the autopsy findings. There was hepatic cirrhosis of the portal type.

A. G. B.

GLASER (R. W.). **Acquired Immunity in Silkworms.**—*Jl. of Immunology.* 1925. July. Vol. 10. No. 4. pp. 651–662. [7 refs.]

The author notices the paucity of recorded experiments on acquired immunity in insects. He discusses two different instances of acquisition of immunity to virulent bacilli by insects, the immunity being imparted by a prior inoculation, in the one instance of an old culture, in the other by a heat-killed culture, of the specific bacillus. In the latter instance—as in most of the recorded experiments both on natural immunity and on acquired immunity in insects—the bacillus employed was " foreign " to the insect employed in experimentation, i.e., was not one that in the ordinary course of things is the cause of a specific insect disease. The author's experiments here described were made in connexion with a specific flacherie-like disease of silkworms, and the following are his conclusions :—

" Acquired immunity towards a " Flacherie "-like disease was produced in a large number of silkworms by injecting killed cultures of the specific bacillus. Subsequent infection by feeding the living bacillus rarely produced the disease. A single treatment with vaccine so employed, perhaps, demonstrates some immunizing effect, but more than one treatment is necessary to obtain a pronounced effect.

" Acquired immunity against this disease was not produced by feeding vaccine, followed by feeding the living culture ; nor was any noticed by injecting the vaccine, followed by the inoculation of a minimum lethal dose of the living culture."

A. A.

DE MELLO (Froilano). Syndrome anaphylactique après l'injection d'un gramme de chlorydrate de quinine. [**Anaphylaxis after Injection of a Gramme of Quinine Hydrochloride.**]—*Bol. Ger. Med. e Farmacia.* Bastora. 1926. Jan.–Sept. Vol. 11. Nos. 1–9. pp. 28–29.

LE DANTEC in his text-book of tropical medicine states that anaphylaxis occurs only after the ingestion of quinine, never after its parenteral administration. The author relates the case of a soldier who after an injection of 1 gm. quinine hydrochloride developed general urticaria with intolerable pruritus, dilated pupils and thready pulse.

A. G. B.

BISHOP (Louis Faugere). Cardiovascular Disease in the Tropics.—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 455–460.

BLONDIN. Utilisation par les indigènes de " Caisses de Secours " en dépôt dans les villages.—*Bull. Soc. Path. Exot.* 1926. Dec. 8. Vol. 19. No. 10. pp. 943–944.

COLE (H. A.). Gonococcal Abscess in the Wall of Uterus simulating an Ovarian Tumour.—*Kenya Med. Jl.* 1926. Sept. Vol. 3. No. 6. pp. 171–173.

DARGEIN (G.) & DORÉ (G.). Un cas de mort par le tréparsol.—*Bull. et Mém Soc. Méd. Hôpit. de Paris.* 1926. Dec. 2. Year 42. 3rd Ser. Vol. 50. No. 36. pp. 1653–1656.

FAUQUÉ (M. C. J.). Sur un cas de méningococcémie à type palustre avec purpura ayant abouti au bout de 41 jours à une méningite cérébro-spinale.—*Arch. Méd. et Pharm. Milit.* 1926. Sept. Vol. 85. No. 3. pp. 296–299. With 1 chart.

**Gopalan** (N.). A Case resembling Infantile Cirrhosis of the Liver in which Recovery took Place.—*Indian Med. Gaz.* 1926. Feb. Vol. 61. No. 2. pp. 76–77.

**Halfer** (Giuseppe). Il comportamento del liquido cefalo-rachidiano nelle malattie tropicali.—*Arch. Ital. Sci. Med. Colon.* 1926. Sept.–Oct. Vol. 7. No. 9–10. pp. 202–208. [25 refs.]

**Hudellet.** Présentation de radiographies. [Lésions osseuses du poignet, ostéo-périostite du radius.]—*Bull. Soc. Path. Exot.* 1926. Apr. 14. Vol. 19. No. 4. pp. 312 313. With 1 text fig.

**Hyvert** (R.). Pougues et les maladies des pays chauds.—*Rev. Prat. Malad. des Pays Chauds.* 1926. June. Year 5. Vol. 6. No. 4. pp. 235–239.

**Ishii** (Toraaki). On the " Hino Yamai," an Epidemic Sun-Burn in Nagano Ken. —*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 559–564. With 1 plate.

**Kouwenaar** (W.). Intoxication by Carbon Tetra Chloride.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 1001–1009. With 6 figs. on 1 plate. [See this *Bulletin,* Vol. 23, p. 480.]

**Lloyd** (R. B.). Practical Points in Blood Grouping and the Selection of Donors for Blood Transfusion.—*Indian Med. Gaz.* 1926. Oct. Vol. 61. No. 10. pp. 493–496. [14 refs.]

**Schilling-Siengalewicz** (S.). Niektóre własności farmakodynamiczne preparatu " Bayer 205." Experimentelle Untersuchungen ueber Pharmacodynamische Eigenschaften " Bayer 205."—*Medycyna Doświadczalna i Społeczna.* Warsaw. 1926. Vol. 6. No. 5–6. pp. 408–421. [16 refs.] German summary p. 422.

**Schöbl** (Otto). Chemotherapeutic Experiments with Chaulmoogra and Allied Preparations.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 1011–1014.

**Yasuyama** (K.). Some Factors influencing, in vivo, the Result of the Globulin Precipitation Test.—*Philippine Jl. Sci.* 1926. Dec. Vol. 31. No. 4. pp. 431–439. [3 refs.]

# REVIEWS AND NOTICES.

## ANALES DE LA FACULTAD DE MEDICINA. Lima. Numero Extraordinario. 1925. Oct. 1. 106 pp. With 6 plates, 1 chart & 1 fig.

This special number of the organ of the Lima Faculty of Medicine, which is the first to be published in the nine years of its existence, has been issued to commemorate a meeting of the Faculty held on September 8th, 1924, when an honorary degree was conferred on Dr. Alberto BARTON in recognition of his valuable work on verruga peruviana and addresses were given by Dr. Telemacho BATTISTINI and Professor MONGE on the experimental inoculation of the disease.

Barely a third of this interesting issue, however, is occupied by the proceedings of the meeting, the remaining two-thirds being devoted to other papers on verruga peruviana, or Carrion's disease, as it is often called in Peru in honour of the heroic student Daniel A. CARRION, who as Dr. Carlos MONGE relates in a special memoir, successfully inoculated himself on August 27th, 1885, in both arms with blood from a verruga lesion to determine whether verruga was related to Oroya fever or a distinct clinical entity.

CARRION's thesis on verruga, which was published posthumously in 1886, is reproduced with an account of his last illness, part of which was recorded by himself.

The remaining 40 pages consists of obituary notices of CARRION from the scientific and lay press of various countries with the appreciation of his self sacrifice. Mention should also be made of a Peruvian bibliography of Verruga compiled by Dr. Hermilio VALDIZAN.

This issue, which will appeal with equal force to those interested in tropical diseases and the history of medicine, is illustrated by portraits of CARRION, BARTON and BATTISTINI, and facsimiles of the title pages of the works of Pedro Gago De VADILLO (1630), CARRION and ODRIOZOLA (1898).

J. D. Rolleston.

## ARAUJO (H. C. de Souza). Lazaropolis do Prata. A primeira colonia agricola de leprosos fundada no Brasil. [**Prata Agricultural Colony for Lepers, Brazil.**]—186 pp. With 34 plates & 2 figs. Departamento Nacional de Saúde Publica. Serviço de Saneamento e prophylaxia rural no Estado do Pará. 1924. Empreza Graphica Amazonia. Belém-Pará.

This work, which is issued by the Service of Sanitation and Rural Prophylaxis of the State of Para, which forms part of the Brazil National Department of Public Health, contains a full account of the Prata agricultural colony for lepers of which a description was given by Mario RANGEL some months ago (see this *Bulletin, ante* p. 206).

The first of the four parts of which the work is composed deals with the period of negotiation for the establishment of a model colony for lepers, the object of which was to provide its unfortunate inmates with all the moral and material comfort possible. The proposal was carried out in spite of considerable opposition, not only by private individuals, but also by members of the Para Chamber of Deputies. Enthusiastic support, however, was given by certain organs of the lay press, extracts from which are reproduced.

In the second part a description is given of the colony, which was intended for the following classes of patients:

(1) Adult lepers of both sexes who could hold an official position or were qualified to impart instruction, and whose health was sufficiently good to allow them to work,

(2) Lepers of any age or sex who required shelter and protection.

(3) Lepers whose pathological condition, habits, profession or other circumstances made them a danger to the community.

(4) Any leper whose condition was likely to be cured or improved by modern methods of treatment.

(5) Lepers in easy circumstances who wished to be admitted at their own expense.

A selection of 600 was made accordingly out of about 2,000 who applied for admission, and it is probable that before long room will be found for another 200 patients. The indigent patients were classified in 3 groups: (1) Children under 14 who were allocated in special pavilions according to their sex and state of health. (2) Vigorous adults of both sexes who were given work in accordance with their capacity. (3) Sick adults for whom a special pavilion was made.

The third part is concerned with the details of administration, and the fourth part is devoted to an account of the opening ceremony, which took place on June 24th, 1924, followed by the rules and regulations connected with the colony.

The text is interspersed with numerous photographs and plans of the buildings and grounds of the colony, and portraits of the principal men connected with its inauguration and management.

J. D. Rolleston.

MÜHLENS (Pedro), DIOS (Roberto L.), PETROCCHI (Juana) & ZUCCARINI (Juan A.). Estudios sobre Paludismo y Hematologia en el Norte Argentino. [**Malaria and Haematology in North Argentine.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1925. Dec. Vol. 4. No. 3. pp. 207–357. With 2 maps, 70 figs., 6 charts & 2 coloured plates.

This December number of the "Review" is entirely devoted to the records of a medical expedition into the northern parts of Argentina and therein the above-named writers give the results of 6 months' work. A map showing their itinerary forms the frontispiece. The first and longest chapter deals with malaria. To gauge the parasitic index numerous specimens of blood were taken from adults and children. The results of some thousands of examinations are tabulated for each province visited. The tables also include trypanosomes and microfilaria and the text is illustrated by numerous photomicrographs of Plasmodia in various stages. Section II—Splenic Index—contains several tables and is fully illustrated with photographs. The lower limits of the spleen are marked on the abdomen of each child leaving no doubt as to the serious nature of the enlargement. The distribution of anopheles was studied and the entomologist identified and dissected a large number of anophelines and other mosquitoes. Lists are given and a plate (p. 265) shows the wing markings of 9 species of anopheles. One photograph shows Dr. Petrocchi up a tree collecting larvae from the leaves of a Bromelia. The authors emphasize their belief that malaria is above all a disease of the rural population and of the poor agricultural workers. Methods of mosquito destruction and other forms of prophylaxis are described. The work also includes a full account of the disease conditions produced by *Trypanosoma cruzi*, carried by the bug *Triatoma infestans* Klug. Here, again, we find good photomicrographs and two excellent coloured plates. The rest of the record is taken up by short sections on diseases due to Filaria, *bancrofti* and *demarquayi*, well illustrated; goitre and cretinism; yaws; ancylostoma and leprosy. The authors are to be congratulated on the results of the expedition.

J. H. Tull Walsh.

ANDERSON (William K.). [M.D., F.R.F.P.S. (Glas.), etc.] **Malarial Psychoses and Neuroses. With Chapters Medico-Legal, and on History, Race Degeneration, Alcohol, and Surgery in Relation to Malaria.**—pp. viii+395. With 18 text figs. & 4 coloured plates. 1927. London: Oxford Medical Publications. Humphrey Milford. Oxford University Press. [42s.]

The title of this book scarcely indicates the vast range of material concontained within it. Besides dealing with neuroses and psychoses, the author includes chapters on the history and pathology of malaria, on the effect of the disease on character and race, on medico-legal aspects, on the relation of malaria and alcohol, on organic disease of the nervous system, on latent malaria, periodicity, surgery and treatment.

The pathology of the central nervous system is dealt with fully, and beautiful colour plates of cell changes are given. The lesions are divided into two groups, those due to vessel blockage and those due to inflammatory reactions, but there is little, with the exception of pigment deposit and granulomata, definitely characteristic of malaria. Over 50 pages are occupied with the pathology of the vegetative nervous system and the endocrine glands, and the information in this section alone is worthy of careful study. The author suggests that the manifestations of the malarial paroxysm can be explained in terms of stimulation of the vagus, next, during the cold stage, of the sympathetico-adrenal system, and, later, in the hot stage, of the parasympathetic system with increase of thyroid activity. With regard to chronic forms of malaria, the conditions are divided into two groups, the sthenic with hyperparasympathetic and hyperthyroidic phenomena and the asthenic with sympathetico-adrenal fatigue. These two types may be present at different times in the same subject.

Of the psychoses due to malaria, melancholia and simple confusion are the most common. In the author's series of 131 cases of mental trouble, 38 showed depression and 35 confusion. 70 per cent. of the series recovered but 14 per cent. were sent to civil mental hospitals after being in military hospitals for about a year. Depression may occur during the incubation-period although it is frequently associated with the late cachectic condition. The commonest form of confusion is slight and occurs during the paroxysm, but it may be more severe and a prolonged psychosis result. In other cases the confusion may be fleeting in character, appearing and re-appearing from time to time with clear, lucid intervals. Confusion and melancholia may be present in the same patient. Following the primary confusion or melancholia, delusional insanity or clinical dementia praecox may develop. Mania, delirium, coma and stupor are more likely to be primary conditions. Dr. Anderson believes that psychasthenia, the definition of which as given by many writers excludes cases caused by exhaustion or toxic factors, can be due to malaria, and instances are given where latent hysteria has been lit up by the disease. Exhaustion psychoses and dementia may be produced by malaria, the last-named mental condition being comparatively common in slight degrees. Neurasthenia is another relatively common condition. Amnesia, with sometimes a permanent gap in the memory for the malarial attack, may occur, as may retrograde and anterograde amnesic states.

With all these mental conditions liable to be produced by malaria, it is clear that a medico-legal aspect of the disease must exist. This aspect is ably described. Examples are given of homicide, suicide, simulation of drunkenness, self-mutilation, incendiarism, embezzlement and assault due to malaria. A hypersensibility to alcohol may also be produced by the disease, even in persons accustomed to large quantities of alcohol. Alcoholism may induce attacks, and can increase the severity of malaria.

The signs and symptoms of organic disease of the nervous system being directly related to the anatomical site of the lesion, it is not surprising that malaria, with its focal distribution of parasites, can produce symptoms of most forms of organic nervous trouble. The cases described are examples of many such diseases, and thus again draw attention to the varied aspects of malaria.

Dr. Anderson includes chapters on latent malaria and periodicity of symptoms. He enters into these aspects thoroughly as they deserve, for the accurate diagnosis of malaria is essential not only in medico-legal cases, but also in the diverse clinical conditions that may be produced by the disease. Finally, the author discusses the surgical aspects and the treatment.

The book is well written and well produced and a comprehensive bibliography of many hundreds of references is included. The only criticism that the reviewer can make is that in some of the cases quoted the diagnosis of malaria has not been confirmed by the finding of parasites, and that, when found, the species is often not stated. These faults are not, however, those of the author but of the writers cited.

The book opens up a new field in malariology and should prove of great value to those who have to deal with this widespread disease.

G. de M. Rudolf.

DAWSON (Warren R.). **John Lydekker. The Memorial at Lloyd's.**—20 pp. With 7 figs. 1927. London. [Issued by the Seamen's Hospital Society with acknowledgments to *Lloyd's List & Shipping Gaz.*]

John Lydekker (1778–1832), a whale-oil merchant and ship owner of London, who died of cholera in Fenchurch Street, left the residue of his estate to the Seamen's Hospital Society, thereby placing it for the first time on a solid financial basis. He is commemorated in a marble monument at Lloyd's, which is here illustrated. This pamphlet gives a brief history of his life and some account of London in his time.

A. G. B.

**Lister Centenary Exhibition at the Wellcome Historical Medical Museum. Handbook 1927.**—216 pp. With 43 figs. & 1 plate. London: 54a, Wigmore Street, W.

**Wellcome Historical Medical Museum.** [WELLCOME (Henry S.), Director, MALCOLM (L. W. G.), M.Sc. (Cantab.), F.R.S.E., Conservator.]—118 pp. With 36 figs. & 1 plate. 1927. London: The Wellcome Foundation Ltd.

The Lister Centenary, recently celebrated, has been the occasion of interesting books and papers. This souvenir handbook, prepared for the Exhibition held at the Wellcome Historical Medical Museum, is a valuable permanent record of Lister. It opens with a short account of the evolution of Lister's system of antiseptic surgery by Sir Hector CAMERON. There follows a life of Lord Lister, an account of his researches and a list of his house-surgeons and dressers from 1861 to 1893. The bulk of the book is occupied by the Guide and Catalogue to the Exhibition with illustrations of those objects which lend themselves to the pictorial method. The whole is well illustrated and printed.

The second volume is a handbook intended to indicate in a general way the chief features and objects exhibited in the Museum and concludes with an account of the opening ceremony in 1913 and the re-opening ceremony in 1926.

A. G. B.

BUREAU OF HYGIENE AND TROPICAL DISEASES

# TROPICAL DISEASES BULLETIN.

Vol. 24.] 1927. [No. 9.

## RELAPSING FEVER AND OTHER SPIROCHAETOSES.

ROSENHOLZ (H. P.). Die Rolle der Wanzen in der Epidemiologie des Rückfallfiebers. [**The Rôle of the Bug in the Epidemiology of Relapsing Fever.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Apr. 12. Vol. 102. No. 4–5. pp. 179–213. With 3 text figs. [48 refs.] [Educ. Commissariat, R.S.F.S.R., Moscow.]

The paper gives an account of what appear to be very carefully conducted experiments on the behaviour of relapsing fever spirochaetes in bed bugs, and the part played by these insects in the transmission of the disease. The method of handling, keeping, feeding and inoculating the bugs is given, together with most relevant historical data. The outcome of the enquiry is that, as in the case of the louse, in a certain percentage of bugs, within a few minutes of their ingestion of infected blood, some of the spirochaetes commence to make their way to the haemocoele where they multiply and persist in virulent form for long periods, probably for the remainder of the bug's life. Contamination of the slightest lesion of the skin with haemolymph from damaged or crushed bugs is able to cause infection.

With regard to the persistence and virulence of spirochaetes in bugs, most of the earlier references are given. It is noted that the observation of KARLINSKY, 1902 (*Cent. f. Bakt.* I.Abt. Orig. Vol. 31, p. 566), of the presence of living spirochaetes in bugs 30 days after feeding on infected blood has usually escaped recognition. [No mention, however, is made of the reviewer's observation of living spirochaetes for 20 days (G. V. SMITH, " On some cases of relapsing fever in Egypt and the question of carriage by domestic vermin." London, 1909), nor of DUNN's experiments (1923), which showed that animals could be infected by the injection of crushed bugs 32 days after feeding, and that stained films of the coelomic fluid showed spirochaetes up to 15 days (this *Bulletin*, Vol. 20, p. 877).]

The spirochaetes with which the author conducted his experiments were *Treponema duttoni* and *T. recurrentis*.

The first question to determine was the length of time spirochaetes could persist in bugs without any reference to the different parts of the body. Batches of bugs were fed on infected mice and at varying intervals were crushed, the emulsion resulting from a number of bugs being injected into one mouse. In the case of *T. duttoni* it was found that the emulsion of bugs kept at a temperature varying from 13° to 24° C. infected mice up to 59 days. Taking the 5 to 59 day batches it was found that only 6 per cent. of the bugs harboured infective spirochaetes. In the case of *T. recurrentis* similar results were obtained.

Investigating the stomach contents, it was found that in the case of *T. duttoni* the spirochaetes remained alive and virulent for 48 hours. After this, motionless forms began to appear till finally all spirochaetes present were non-motile, faintly staining and non-infective. In about 5 days the stomach was almost free from recognizable spirochaetes. Though the spirochaetes begin to lose their motility after 48 hours there is not immediately a loss in virulence, for animals may still be infected with them. On the 3rd and 4th days, however, the virulence decreases in relation to the number of motionless forms present. Similar experiments were conducted with *T. recurrentis*, the strain of which was more virulent for mice. In this case the bugs were kept at a uniform temperature of 23°–24° C. The spirochaetes behave like *T. duttoni*, but they disappear more slowly, for even as late as the 8th or 9th day large numbers of motionless forms may be still present.

Fluid from the haemocoele was examined by amputation of a limb, antenna or other appendage. Both *T. duttoni* and *T. recurrentis* commence to make their way to the haemocoele from the stomach within a few minutes of their ingestion, but not in all bugs. In the case of the former spirochaete it occurs in 10 to 12 per cent. of the bugs, and in the case of the latter in 15 to 30 per cent. The haemolymph is a very favourable medium, for the spirochaetes become numerous in it in 48 hours and they persist there for long periods, even as much as five months. It is evident they occur in all the parts of the body in which the haemolymph occurs. As many as 100 spirochaetes may be seen in each field of the microscope. The application to very small lesions on the skin of mice of drops of the fluid containing spirochaetes leads to infection. The virulence of these spirochaetes has been proved to persist for 62 days, the longest interval tested. Working with larvae of the first stage, similar results were obtained, so that it is evident that all stages of the bug may become infected in a similar manner.

As regards the spirochaetes in the stomach of the bugs, they lose their motility, become agglomerated into masses and disentegrate, at first into largish then into small portions showing 2 or 3 turns. The breaking up of *T. duttoni* is complete in 4 or 5 days, but in the case of *T. recurrentis* it is slower. These degenerate forms are not capable of infecting mice. It is the spirochaete stage which enters the haemocoele and which produces infection. There is no reason to suppose that a granule phase or any other than that of the spirochaete takes part in the life history of the organism.

Apart from infecting bugs by feeding them on infected mice, the spirochaetes were introduced directly into the haemocoele by inoculation through the cuticle. It was found that spirochaetes introduced in this way multiplied like those which had made their way from the intestine. The technique of inoculating bugs is described.

It seemed advisable to compare the spirochaetes which developed in the haemocoele with those in the mice by serological methods. The one adopted was the thrombocytobarin test, which demonstrated conclusively that the two strains were identical.

Having discovered the spirochaetes in the haemocoele and their long persistence there, it became necessary to discover by what means bugs were able to convey infection in nature. The collected faeces of numbers of infected bugs at varying intervals after their infective feed were examined by the dark field, but on no occasion could anything resembling a spirochaete be found. Furthermore, attempts to infect mice with such faeces invariably failed. Similarly infected bugs were not able to infect mice by their bites. It is concluded that bugs are unable to convey infection by biting human beings, or by contaminating wounds with their faeces. As in the case of the louse, the fluid which exudes from damaged appendages is highly infective when it comes into contact with lesions in the skin, lesions which may be so minute as to be invisible to the naked eye. It would seem, therefore, that the damage of adult bugs leading to exudation of the haemolymph on to the skin, or the crushing on the skin of the very delicate larvae, would in the case of human beings lead to infection. The exact part played by bugs in the natural transmission of relapsing fever has to be investigated in the light of the experimental data now available. The louse, on account of its close association with man, is a more efficient vector, but on the other hand the bug lives longer and would serve as a better reservoir for the virus.

C. M. Wenyon.

RIDING (D.) & MACDOWELL (T. W.). **Preliminary Notes on Relapsing Fever in the Anglo-Egyptian Sudan.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 524–529. With 1 map in text & 2 figs. on 1 plate.

An outbreak of relapsing fever in Western Dafur was studied by the authors, who saw 90 cases during November and December 1926. They suggest that the epidemic originated from an endemic focus in the Marra Mountains region and spread south-westwards to Zalingei and thence along the Wadi Azum. The disease was of 3 types—acute fulminating with death in 48 hours, ordinary severe with heavy mortality and prolonged convalescence in the survivors, and mild ambulatory. The disease appeared to be louse borne and examination of the coelomic fluid of these insects revealed spirochaetes which, however, were shorter than those in the blood of the patients.

C. M. W.

DONALDSON (A. W. H.). **Report on Relapsing Fever at Oadweina.**—*Somaliland Protectorate Ann. Med. & San. Rep. for Year ending 31st December, 1925.* pp. 29–32.

An investigation into an epidemic at Oadweina in Somaliland revealed the fact that it was relapsing fever of the African type and was probably transmitted by *Ornithodorus moubata.* The disease has not been known there before and appears to have been brought from Hargeisa. Its spread to Oadweina causes apprehension and suggests a possibility of a further extension to Berato, El Huma, Burao and elsewhere.

C. M. W.

PAMPANA (E. J.). **Colombian Relapsing Fever simulating Acute Appendicitis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 357–358.

Two cases of relapsing fever showing symptoms very suggestive of appendicitis are described. Both were treated with neosalvarsan, which caused the disappearance of all the symptoms. The author thinks it possible that some of his previous cases which came to the operation table without revealing any abnormality of the appendix may have been of the same type. He suggests that the symptoms may be due to a spastic condition of some segment of the bowel.

C. M. W.

GUILLET (R.). Au sujet de la récente épidémie de dengue à Dakar. Note sur un cas de spirochétose humaine. [**Case of Human Spirochaetosis at Dakar seen in an Epidemic of Dengue.**]—*Bull. Soc. Path. Exot.* 1926. Nov. 10. Vol. 19. No. 9. pp. 860–862. [6 refs.]

During the course of an epidemic of dengue at Dakar a European woman was taken ill with what was at first thought to be this disease. In this case there was a relapsing type of fever, the patient becoming very ill. When seen by the writer 25 days after the commencement of the illness there was no fever, but a blood film revealed fairly numerous spirochaetes which did not resemble those of relapsing fever, no cases of which were being noted there. The organism was inoculated to mice and was maintained in them. It resembled and behaved like *Spirochaeta crocidurae* and in the absence of any cases of relapsing fever it is suggested that the case may be one of infection with this organism, transmitted by a mosquito. There are no Ornithodorus at Dakar, while the patient emphatically declared she had not seen a louse. The illness responded to treatment with acetylarsan.

C. M. W.

VIALATTE (Ch.). Troubles nerveux tardifs à la suite de la fièvre récurrente. [**Late Nervous Symptoms in Relapsing Fever.**]—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 56–60. [9 refs.]

Within five days of recovery from relapsing fever treated by an injection of novarsenobenzol a patient began to show symptoms referable to some change in the central nervous system. These increased in intensity for four days, and then remained stationary for the same period, after which gradual recovery occurred. It is concluded that the symptoms were due to invasion of the central nervous system by the spirochaetes.

C. M. W.

LE GAC. Coma apoplectique observé dans un cas de typhus récurrent. [**Apoplectic Coma in a Case of Relapsing Fever.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Oct.–Nov.–Dec. Vol. 24. No. 4. pp. 588–590.

A record of a case of relapsing fever at Ouadaï, near Lake Chad, in which acute symptoms resembling the apoplectic coma of cerebral haemorrhage supervened. Treatment by intravenous injections of novarsenobenzol brought about rapid recovery.

C. M. W.

HOFMANN (Adolf). Die experimentelle Therapie der Mäuserekurrens durch " Albert 102." [**Experimental Treatment of Relapsing Fever in Mice by Albert 102.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Apr. Vol. 31. No. 4. pp. 182–191. [7 refs.]

The author has tested the curative action of " Albert 102 " on mice infected with relapsing fever spirochaetes. The ordinary course of the infection is for the spirochaetes to disappear from the blood in 4 or 5 days and to reappear in 3–5 days. The first relapse lasts 2–3 days. Thereafter other shorter and milder relapses occur. This relapsing infection occurs in about 25 per cent. of animals only, 75 per cent. dying at the height of the first attack. The animals were treated 24 hours after injection and were carefully watched for 60 days, after which they were reinoculated with spirochaetes to discover whether they were non-immune owing to the complete disappearance of spirochaetes after treatment. It was found that the minimal efficacious dose of " Albert 102 " was 0·02 gm. per kilo of mouse. Such treated animals in most cases ceased to have spirochaetes in the blood in 24 hours. After their disappearance there was no return during the 60 days' observation when it was found that the animals could be reinfected. Compared with various salvarsan compounds it was found that " Albert 102 " gave the best results, so that the author is led to believe that it might play a part in the combat of the human disease.

C. M. W.

KRITSCHEWSKI (J. L.). Ueber die Salvarsanfestigkeit der Recurrensspirochäten. [**Salvarsan Susceptibility of Relapsing Fever Spirochaetes.**]—*Klin. Woch.* 1927. Mar. 5. Vol. 6. No. 10. pp. 441–445. [9 refs.]

Working with 7 different strains of relapsing fever spirochaete in mice the author has found that there is considerable variation as regards their susceptibility to therapeutic doses of salvarsan. It is evident, therefore, that in testing the therapeutic efficiency of drugs this fact should be taken into account and that it is very desirable that a further effort should be made towards a solution of the problem of the chemotherapy of spirochaete infections, salvarsan not necessarily being the final word.

C. M. W.

KRITSCHEWSKY (L. W.). Ueber die sterilisierende Fähigkeit des Salvarsans im Bezug zu den Spirochäten. [**Sterilizing Capacity of Salvarsan for Spirochaetes.**]—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 227. [In Russian pp. 220–227. 3 refs.]

Salvarsan, even in doses near the toxic limit, is unable to bring about complete sterilization of all mice infected with relapsing fever spirochaetes. Reduction of the dose of virus or treatment at early stages of the infection does not lead to a point when it can be said that all the animals have been freed of their infection.

C. M. W.

KRITSCHEWSKI (J. L.) & BRUSSIN (A. M.). Das provozierte Rezidiv, die Superinfektion und die Reinfektion beim Recurrens. [**Provoked Relapse, Superinfection and Reinfection in Relapsing Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Nov. 8. Vol. 49. No. 1–2. pp. 180–198. [19 refs.]; also in *Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 186. [In Russian pp. 170–186. 19 refs.]

The results of reinoculating mice which have already suffered from a relapsing fever infection may be actual reinfection, superinfection or provocation of a still persisting infection. If reinfection is judged to have taken place then it must have been established beyond doubt that the original infection has been entirely eliminated. The conclusion of EHRLICH and HATA that if after reinoculation spirochaetes appear in the blood then the animal must have been entirely rid of its original infection is invalidated by the possibility of superinfection and provocative infection. Even the brain test of BUSCHKE and KROÓ only gives information when the animals inoculated with the brain substance of apparently recovered animals become infected. In other words definite information of a persisting infection is given by a positive result while a negative one does not entirely exclude a persisting infection. It is evident, therefore, that there is considerable difficulty in deciding definitely whether an animal is entirely free from the organisms which gave rise to an infection from which it has apparently recovered. By combining the serological tests involving the presence of thrombocytobarin and the brain test it is concluded that superinfections can be produced.

C. M. W.

BRUSSIN (A. M.). Ueber eine neue Immunitätsreaktion bei experimentellen Rückfallfieber. [**A New Immunity Reaction in Experimental Relapsing Fever.**]—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 51. [In Russian pp. 36–51. With 2 text figs. 8 refs.]

The specific substance termed thrombocytobarin appears in mice infected with relapsing fever spirochaetes one or two days after the crisis, whether naturally occurring or artificially produced by treatment. The reaction is so specific that first attack and relapse strains of spirochaetes can be distinguished. As a test of infection the reaction is likely to be of value for diagnostic purposes and for the differentiation of spirochaetes and the study of immunity.

C. M. W.

STREMPEL (Rudolf) & ARMUZZI (Giuseppe). Immunitätsstudien bei dem experimentellen Rückfallfieber der Maus. [**Studies on Immunity in Experimental Relapsing Fever in Mice.**]—*Klin. Woch.* 1927. Jan. 8. Vol. 6. No. 2. pp. 62–64. [7 refs.]

A long paper on relapsing fever immunity of mice. It is noted that the persistence of spirochaetes in the brain of immune mice is an exceptional and transitory phenomenon. These persisting spirochaetes are in no way resistant to the antibodies in the serum. Mice which have been infected by intraperitoneal inoculation and have become

immune to further infection by this method of inoculation may in many cases be reinfected (superinfection) by subcutaneous inoculation. There is no passage of spirochaetes or immune substances through the placenta of mice.
C. M. W.

STREMPEL (Rudolf) & ARMUZZI (Giuseppe). Studien ueber das experimentelle Rückfallfieber. Die Beziehungen der Recurrensspirochäte zum Gewebe. [**Experimental Relapsing Fever. Relation of the Spirochaetes to the Tissues.**]—*Klin. Woch.* 1927. Jan. 29· Vol. 6. No. 5. pp. 200–204. [12 refs.]

An investigation into the relation of the spirochaetes to the cells of the body in relapsing fever in mice has shown that the organisms are capable of actively penetrating various tissue cells which do not exhibit any phagocytic action. Degenerated forms of the spirochaete were seen in red blood corpuscles and phagocytes of the spleen as also in liver cells. The brain parenchyma contains spirochaetes at all stages of the infection, but their presence there in the immune period is only demonstrable by inoculation of brain substance into other mice. The spirochaetes do not appear to produce any noticeable histological changes in the brain.
C. M. W.

BRUYNOGHE (R.) & COLLON (N.). Le blocage du système réticulo-endothélial dans l'infection récurrente. [**Blocking of the Reticulo-Endothelial System in Relapsing Fever.**]—*C.R. Soc. Biol.* 1927. Jan. 28. Vol. 96. No. 3. pp. 213–214. [4 refs.]

With a view to testing the function of the reticulo-endothelial system in the production of lysis in experimental relapsing fever in mice a series of these animals was given on three successive days a subcutaneous dose of 0·2 cc. of a 1 per cent. solution of trypan blue. Five animals which survived this treatment were then inoculated with *Treponema duttoni*. In 4 of them and in the controls the infection ran the same course, there being 2 relapses. One of the animals died at the first attack, but this was thought by the author to be a delayed death resulting from the trypan blue. However this may be, it is clear that in the 4 survivors the blocking of the reticulo-endothelial system did not influence the production of lysis. Attempts to block the system with pig serum were also made. Mice infected with the spirochaete were given daily a dose of 0·5 cc. of pig or human serum. Though the pig serum is supposed to have an inhibiting action on the production of antibodies all the animals showed a more intense infection than the controls.
C. M. W.

VINZENT (René). Spirochétose de la souris blanche et infection mixte trypano-spirochétique. [**Spirochaetosis of the White Mouse and Mixed Trypanosome-Spirochaete Infection.**]—*Ann. Inst. Pasteur.* 1927. Feb. Vol. 41. No. 2. pp. 131–147. With 8 graphs. [18 refs.]

The sudden appearance in mice during the course of certain trypanosome experiments of a spirochaete of the relapsing fever type has already been noted (*ante*, p. 86). It is pointed out that the spirochaete cannot have owed its presence to an accidental laboratory infection, for the mice were new ones from the Institute of Strassburg, where no strains of spirochaete were being kept. Furthermore the spirochaete appeared in only one of six mice inoculated from another one, which was infected with *Trypanosoma somaliense* and which died in the usual way. Subsequent experiments have shown that if a mouse is inoculated with the trypanosome and spirochaete at the same time the spirochaete appears in the blood first and as it disappears the trypanosomes increase in number up to the death of the animal. This course is of regular occurrence in dually inoculated animals. In the mouse in which the spirochaete was first found it occurred in great numbers in the blood at the moment of the death of the animal 22 days after the trypanosomes had been inoculated. The author does not believe that the spirochaete had an intestinal origin in the mouse in question. He appears to hold the view that there was a latent infection which was lighted up by the trypanosomes. The spirochaete has been shown to be inoculable to man. A general paralysis case after inoculation by scarification showed spirochaetes in his blood on the sixth day. The infection lasted 72 hours during which there was a febrile reaction, the highest temperature noted being 39·5° C. At the height of the infection there were 4 to 5 spirochaetes per field of the microscope. There was no relapse.

The influence of the spirochaete infection on the *Trypanosoma somaliense* infection of mice was carefully studied. This was rendered possible because of the marked uniformity of the spirochaetal infection in mice as also that of the trypanosome. In young rats and mice whatever method of inoculation be adopted the spirochaetes appear in the blood in 3 days ; they increase up to the 6th day, when 5 to 6 are seen in each field. They disappear but return at intervals of 4 to 6 days up to the 21st day. The trypanosome infection first shows itself in 2 to 5 days according to the dose of virus. There is then a regular increase in the trypanosomes leading to the death of the animal on the 5th to 9th day. If the animals are inoculated with trypanosomes and spirochaetes simultaneously the infection occurs in three stages. The first lasts 8 to 9 days and represents the incubation period and the first appearance of parasites. Both parasites appear at the usual time, but instead of rapidly increasing in number the trypanosomes multiply slowly and then at about the 6th day become very difficult to find. This disappearance of trypanosomes is followed by an increase in the spirochaetes and the second stage of 15 to 20 days is initiated. During this stage the spirochaetes appear and disappear successively from the blood, the trypanosomes remaining very scanty and difficult to detect. At the end of this stage the trypanosomes begin to increase in numbers as they do in the unmixed infection and lead to the death of the animal on the 30th to 40th day. Spirochaetes may or may not be present during this stage. There is thus a definite antagonism between the two infections, but the author does not believe that such exists between the two parasites. He thinks that the changes in the host brought about by the spirochaetes, one of which is a marked mononuclear increase during its presence, render it less favourable to development of the trypanosomes. At the time that the trypanosomes multiply rapidly at the third stage the mononuclears decrease in number. It is suggested that some mechanism of the sort occurs in the inoculation treatment of general paralysis.

C. M. W.

NICOLAU (S.). Syphilis et fièvre récurrente. [**Syphilis and Relapsing Fever.**]—*C.R. Soc. Biol.* 1927. Jan. 14. Vol. 96. No. 1. pp. 36–38. [2 refs.]

Inoculation of relapsing fever spirochaetes or *Spirochaeta crocidurae* into the actual lesions or into the veins of rabbits suffering from experimental syphilis does not modify in any way the course of the syphilitic infection. There is thus no antagonism between the spirochaetes. Inoculation of rabbits with relapsing fever spirochaetes does not give rise to severe fever as it does in man, so that this factor is not present to influence the disease. C. M. W.

i. BRUYNOGHE (R.), DE GREEF (Et.) & DUBOIS (A.). L'hémoculture dans la fièvre récurrente humaine. [**Blood Culture and Serological Researches in Human Relapsing Fever.**]—*C.R. Soc. Biol.* 1927. Apr 26. Vol. 96. No. 13. pp. 1071–1072. [1 ref.]

ii. ——, —— & ——. Recherches sérologiques dans la fièvre récurrente humaine.—*Ibid.* pp. 1073–1074. [1 ref.]

i. In a medium similar to that described by GALLOWAY (this *Bulletin* Vol. 23, p. 111) the authors have cultivated the relapsing fever spirochaete from human blood.

Narrow tubes, in the bottom of each of which is placed some egg albumin, are revolved in the water bath till each is lined by a thin layer of coagulated albumin. Into each tube is introduced rabbit serum, diluted 1 in 5 to 1 in 8 with Ringer's solution (glucose 1; NaCl 9; KCl 0·42; $CaCl_2$ 0·24; $NaHCO_3$ 0·10; distilled water 1,000). The contents of the tubes are then covered with a layer of sterile vaseline and heated in the water bath at 56° C. for 1 hour. In this medium inoculated with infected blood by means of a long pipette the spirochaetes grow well at a temperature of 36°–37° C. The maximum growth is reached on the 8th to 10th day. In all cases when spirochaetes could be seen in the blood culture was obtained and also in cases when no spirochaetes could be detected. The authors believe that the method can be employed for diagnostic purposes. Subcultures can be made as late as the 15th day, but before inoculating the tubes it is necessary to add red blood corpuscles, in the shape of a drop of mouse, rabbit or human blood. Red blood corpuscles occur of course in the primary culture and the authors state that they are necessary for the growth of the organisms.

ii. In the second paper the authors give some details of experiments designed to test the agglutinating analytic action of the serum of relapsing fever convalescents on the cultural spirochaetes. They were not able to demonstrate the presence of substances acting in this way. Attempts to obtain fixation of alexine by the spirochaetes gave irregular results, while no evidence was obtained that the serum of convalescents gave a Wassermann reaction with an antigen of the cultural forms of the relapsing fever spirochaete. C. M. W.

HOELTZER (R.) & ZABOLOTZKAJA (T.). Vergleichendes Studium der Kultivierungsmethoden der *Spirochaeta Obermeieri.* [**Comparative Study of Methods of Cultivation of** *S. obermeieri.*]—*Cent. f. Bakt.* I. Abt. Orig. 1926. Nov. 26. Vol. 100. No. 7–8. pp. 306–310. [1 ref.]

The authors have made a comparative study of various methods which have been recommended for the cultivation of the relapsing fever spirochaete. The organism was inoculated directly from the blood of man into the culture media. It was found that the medium of Aristowsky and Hoeltzer (this *Bulletin*, Vol. 22, p. 712) gave the best result. It was also noted again that the serum of one horse may be more suitable than that of another. In the present series of experiments the sera of two horses, B and W, were used. In medium prepared from serum of B it was possible to grow the spirochaete only in a few cases, whereas with serum of W, success was obtained in all cases but one, which was that of a patient who had commenced salvarsan treatment. It was noted, however, that strains which failed to grow in medium prepared with B after inoculation directly from the patient, might in some cases grow in it after a few generations of culture with serum W. As regards methods of culture recommended by other observers it was found that none of them gave such good results as that of Aristowsky and Hoeltzer.

C. M. W.

i. Schreus (H. Th.). Ueber die wechselseitige Beeinflussung von Rekurrens- und Naganaerregern. [**The Reciprocal Influence of Relapsing Fever and Nagana.**]—*Dermat. Woch.* 1926. Vol. 83. No. 52a (Ergänzungsheft) pp. 1885–1889. [9 refs.]

ii. Joseph (A.). Ueber die Beziehungen der Erreger bei der (exper.) kombinierten Rekurrens-Nagana-Infektion. Bemerkungen zu der Arbeit von H. Th. Schreus in Nr. 52a der Derm. W., 1926, Bd. 83.—*Ibid.* 1927. Apr. 9. Vol. 84. No. 15. p. 501.

Schreus (H. Th.). Zu vorstehender Bemerkung des Dr. A. Joseph.—*Ibid.* pp. 501–502.

i. In the first paper Schreus notes that in 1910 both Trautmann and Daels showed that a nagana infection of mice was altered by a concurrent relapsing fever infection, so that its usual acute course was changed to a chronic one during which trypanosomes disappeared from the blood at intervals. The author has confirmed and extended these observations.

ii. In the second paper Joseph draws attention to the fact that his published work (this *Bulletin*, Vol. 24, p. 81) was not taken into account by Schreus, who in the third paper replies that the experiments of Joseph were the reverse of his and were designed to test the influence of a trypanosome infection on a persisting spirochaete infection of the brain.

C. M. W.

Jahnel (F.). Ueber das Vorkommen der *Spirochaeta Duttoni* im Hirngewebe des Menschen (Paralytikers) während der Rekurrensinfektion. [**Occurrence of *S. duttoni* in the Brain of a Paralytic during Relapsing Fever Infection.**]—*Muench. Med. Woch.* 1926. Nov. 26. Vol. 73. No. 48. pp. 2015–2016. With 1 text fig. [2 refs.]

Histological examination of the brain of a general paralytic who died during relapsing fever treatment, revealed the presence of relapsing fever spirochaetes in the tissues. Their distribution was similar to that described for *Treponema pallidum*.

Cunningham (J.) & Theodore (J. H.). **A Form of Serological Mutation occurring in** *Spironema carteri.*—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 121–131. With 1 chart in text & 8 figs. on 1 plate.

The substance of this paper is the same as that previously reviewed (this *Bulletin*, Vol. 23, p. 112).

C. M. W.

ZEISS (H.). Die Bedeutung der Rückfallfieberspirochäte für die parasitologische Forschung. (Ein Gedenkblatt zum 50-ten Todestag Obermeiers.) [**Significance of the Relapsing Fever Spirochaete for Parasitological Discovery.**]—*Arch. Russes de Protistologie.* 1925. Vol. 4. No. 3-4. pp. 289-295. With 1 text fig. [Russian summary pp. 295-296.]

An article written for the fiftieth anniversary of the death of OBERMEIER explaining how his discoveries, particularly that of the relapsing fever spirochaete, opened up new fields of research and led directly to most important and fruitful enquiries.

C. M. W.

SMITH (David T.). **Analysis of One Hundred Cases of Broncho-Pulmonary Spirochetosis.**—*New York State Jl. Med.* 1927. Feb. 1. Vol. 27. No. 3. pp. 119-122. With 1 text fig. [31 refs.]

——. **Bronchopulmonary Spirochetosis.**—*Amer. Rev. Tuberculosis.* 1927. Mar. Vol. 15. No. 3. pp. 352-372. With 2 text figs. [98 refs.]

These two papers deal with the same series of cases and form a most valuable contribution to the subject. The observations have been carefully conducted and a definite attempt has been made to obtain scientific evidence of the part played by spirochaetes in the pathology of the condition known as broncho-pulmonary spirochaetosis. [In this respect the paper differs from the vast majority which have been published on this subject, and which content themselves with dogmatic assertion unsupported by any reliable evidence.]

In the first place, the author concludes that there is a group of unrelated pulmonary conditions in which spirochaetes, fusiform bacilli and cocci are constantly present. It is generally assumed that the organisms are secondary invaders, but if this were so, one would expect to find them present in all forms of chronic pulmonary disease. However, repeated examinations failed to reveal them in 150 cases of uncomplicated pulmonary tuberculosis, 6 cases of bronchial asthma and 5 cases of mycotic infection of the lung. The spirochaetes, fusiform bacilli and cocci are identical with those commonly present in the mouth, which is probably the source of the pulmonary infection. This view is supported by the fact that pulmonary abscess and gangrene have been produced in mice, guineapigs and rabbits by intratracheal inoculations of material from the gums of patients suffering from severe pyorrhoea.

The cases studied are grouped in the following twelve categories, which show the protean nature of the condition. (1) Lung gangrene. (2) Lung abscess following tonsillectomy. (3) Lung abscess following extra-respiratory operations. (4) Lung abscess complicating neoplasms of the lung. (5) Lung abscess associated with foreign body in lung. (6) Primary or spontaneous lung abscess. (7) Unresolved pneumonias. (8) Acute bronchitis. (9) Bloody bronchitis. (10) Putrid bronchitis. (11) Chronic bronchiectasis. (12) Any of the above associated with pulmonary tuberculosis. To the varied nature of the pathological lesions in broncho-pulmonary spirochaetosis may be attributed the wide difference in the clinical manifestations. In

100 cases the symptoms are cough 95 per cent., expectoration 94 per cent., rales 63 per cent., foul sputum 62 per cent., fever 60 per cent., pleural pain 52 per cent., haemorrhage 50 per cent., foul breath 30 per cent., sputum in three layers 28 per cent., loss of weight 28 per cent., clubbed fingers 13 per cent., night sweats 12 per cent. With the exception of foul sputum, they conform to the prominent symptoms of pulmonary tuberculosis. Brain abscess and empyema are the two important complications. In all cases of empyema spirochaetes, fusiform bacilli and streptococci were found in the pus, while the pus from one of the three cases of brain abscess showed spirochaetes and fusiform bacilli. It is thought that broncial spirochaetosis may be the cause of primary bronchiectasis, for in the sputum of all of 12 cases spirochaetes, fusiform bacilli and cocci were found. As regards treatment spontaneous recovery occurred in a limited number of cases. The arsenical preparations were particularly helpful at times when employed early in the disease. When of six months' duration or longer no instance was seen in which the disease was cured.

The general conclusion is that broncho-pulmonary spirochaetosis is probably the result of aspiration, from the mouth into the lungs, of a group of anaerobic organisms including spirochaetes, fusiform bacilli, cocci and vibrios. No evidence is given as to the part played by these organisms individually.

C. M. W.

GATÉ (J.) & BILLA (M.). A propos des spirochétoses bronchiques (étude parasitologique de 32 cas). [**Bronchial Spirochaetosis. Parasitological Study of 32 Cases.**]—*C.R. Soc. Biol.* 1927. Feb. 4. Vol. 96. No. 4. pp. 284–287.

—— & ——. Contribution à l'étude des spirochétoses bronchiques ; à propos de 32 cas.—*Presse Méd.* 1927. Apr. 23. Vol. 35. No. 33. pp. 513–515. [21 refs.]

The clinical histories of 25 of a series of 32 cases of bronchial affection, showing spirochaetes in the sputum, revealed the fact that 8 were definitely tuberculous, the tubercle bacilli being found in 5, 12 were typical cases of acute bronchial spirochaetosis, while 5 were chronic bronchitics. Subcutaneous inoculation of guineapigs with sputum produced severe local abscess and necrosis, which killed the animals on the eighth day. As a rule, the spirochaetes were limited to the local lesion which contained other organisms also. In one case the spirochaetes were found in the peritoneal exudate. The spirochaete grows readily along with other organisms in dilute horse serum covered with oil. Very polymorphic in the sputum and guineapig lesions it becomes more uniform in culture, where it is seen as a fine spiral organism 15 to 20 $\mu$ in length.

C. M. W.

HUIZENGA (Lee S.). **Broncho-Spirochaetosis.**—*Nederl. Tijdschr. v. Geneesk.* 1927. Apr. 2. 71st Year. 1st Half. No. 14. pp. 1698–1704. With 1 text fig.

This is a long dissertation on bronchial spirochaetosis, the author's experience of which has been acquired in North China, where it is stated Kiangsu is a hot bed of the disease. The author writes that he had previously treated 166 cases at Nanking University, and that in the past year he had treated 345, of whom 65 had tubercle bacilli in the sputum.

[The paper adds little to our knowledge of the subject, but emphasizes the fact that spirochaetes occur very commonly in sputum in various pulmonary conditions, and that the ease with which they are demonstrated, and the assumption that they are the etiological factor in all the diseases in which they occur is largely responsible for the flood of uncritical literature on the subject.]

C. M. W.

MANSON-BAHR (Philip). **Is Bronchial Spirochaetosis a Distinct Clinical Entity?**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 352–353. With 2 figs. on 1 plate.

The author expresses his disbelief in the existence of a clinical entity, bronchial spirochaetosis, and mentions in support of his conviction, two instructive cases, both of which before they came under his notice, had been diagnosed as this condition because of the presence of spirochaetes in the sputum. The first was a case of malignant disease of the lung, the second amoebic abscess of the liver with rupture of the abscess through the diaphragm. The first patient died, while the second was cured by appropriate treatment.

C. M. W.

PELLÉ (A.). Spirochétose broncho-pulmonaire chez les blessés du thorax par projectiles de guerre. [**Broncho-pulmonary Spirochaetosis in Persons wounded in the Thorax by Projectiles.**]—*Bull. et Mém. Soc. Méd. Hôpit de Paris.* 1926. Dec. 16. Year 42. 3rd Ser. Vol. 50. No. 38. pp. 1701–1704.

Four men who had retained since the war metallic fragments of projectiles in their lungs, suffered from cough associated with haemoptysis. Examination of the sputum recently showed that spirochaetes were present and the author's desire is to call attention to the association of the two conditions—presence of foreign bodies in the lungs and bronchial spirochaetosis.

C. M. W.

MENDELSON (Ralph W.). **Chronic Broncho-Spirochaetosis with Acute Exacerbation.**—*Jl. Trop. Med. & Hyg.* 1927. May 16. Vol. 30. No. 10. pp. 126–127. With 1 text fig. [4 refs.]

A woman who had had a cough for about a year, became more acutely ill with night sweats, and evening rises of temperature and cough with much expectoration. When seen three weeks after the onset of the acute condition, it was found that numerous spirochaetes occurred in the sputum. No tubercle bacilli could be found. After she had been put on Fowler's solution for 10 days it was difficult to obtain sputum, so improved was her condition. A sample obtained, however, showed spirochaetes reduced to 75 per cent. of their original number. Three weeks later she stated that she felt quite normal. The case is diagnosed as bronchial spirochaetosis and it is stated that without doubt many such cases are diagnosed as influenza.

C. M. W.

BACIGALUPO (Juan). Expectoraci6n sanguinolenta y espiroquetosis. [**Bloody Sputum and Spirochaetosis.**]—*Semana Méd.* 1926. Dec. 23. Vol. 33. No. 51 (1719). pp. 1705–1707. [4 refs.]

——. Expectoration sanglante et spirochétose.—*C.R. Soc. Biol.* 1927. Apr. 1. Vol. 96. No. 12. pp. 895–896.

Examining 30 samples of blood-stained sputum spirochaetes were found in 9. Of these, 8 actually showed blood at the time of examination and 1 did not, though it was from a patient who had coughed up blood-stained sputum before. The spirochaetes were 4 to 17 microns in length and had 3 to 12 spirals, and as viewed by the dark field microscope were very polymorphic. The coincidence of the blood-stained sputum and the spirochaetes leads the author to attribute to them a pathogenic role.

C. M. W.

SCHLOSSMANN (C.). Recherches sur la spirochétose broncho-pulmonaire. [**Researches on Broncho-pulmonary Spirochaetosis.**]—*Presse Méd.* 1927. Feb. 12. Vol. 35. No. 13. pp. 195–198. [33 refs.]

A long article on bronchial spirochaetosis based chiefly on the work of others. It is concluded that the identity of the spirochaetes in this condition cannot be established till pure cultures are obtained.

MIRONESCO (Th.). Spirochétose bronchiale avec éruption cutanée. [**Bronchial Spirochaetosis with Skin Eruption.**]—*Bull. Acad. Méd.* 1927. May 10. Year 91. 3rd Ser. Vol. 97. No. 19. pp. 598–600.

A patient was admitted to hospital as a typhus suspect on account of an eruption on the body. It was found, however, that the blood-stained sputum coughed up by the patient contained numerous spirochaetes and fusiform bacilli. Treatment in hospital resulted in recovery in eighteen days. The eruption on the body subsided as the spirochaetes disappeared from the sputum.

VISHER (John W.). **Spirochetal Bronchitis. Report of a Case successfully treated with Arsphenamine.**—*Jl. Lab. & Clin. Med.* 1926. Oct. Vol. 12. No. 1. pp. 55–57. [2 refs.]; also in *Amer. Jl. Syph.* 1927. Jan. Vol. 11. No. 1. pp. 65–67. [2 refs.]

The paper describes a case of purulent bronchitis in which spirochaetes and fusiform bacilli appeared to be the etiological factor. Prompt recovery followed the administration of neoarsphenamin intravenously.

VITON (Juan José), CRUCIANI (Julio A.) & VIVOLI (Donato). Un nuevo caso de broncoespiroquetosis de Castellani. [**Fresh Case of Bronchospirochaetosis.**]—*Semana Méd.* 1927. Jan. 6. Vol. 34. No. 1 (1721). pp. 6–10.

A case of bronchial spirochaetosis with haemoptysis successfully treated with neosalvarsan and lipiodol. The presence of tubercle bacilli and hydatid, which was suggested by the sanguineous expectoration, was excluded.

AMILCAR LUZURIAGA (P.) & BACIGALUPO (Juan). Un caso de broncoespiroquetosis de Castellani. [**Case of Bronchospirochaetosis.**]—*Semana Méd.* 1926. Nov. 11. Vol. 33. No. 45 (1713). pp. 1298–1300. With 3 text figs.

A description of a case of bronchial spirochaetosis in an Argentino. Subcutaneous inoculation of 2 guineapigs with sputum resulted in a local lesion in one of the animals and in it spirochaetes were demonstrated.

C. M. W.

SANARELLI (G.). Les spirochètes caecaux. [**Caecal Spirochaetes.**]—*Ann. Inst. Pasteur.* 1927. Jan. Vol. 41. No. 1. pp. 1–44. With 33 figs. on 2 plates. [40 refs.]

——. Gli spirocheti cecali.—*Ann. d'Igiene.* 1927. Mar. Vol. 37. No. 3. pp. 125–160. With 33 figs. on 2 folding plates. [48 refs.]

This long but interesting paper records the results of experiments made with cultures of spirochaetes which were obtained on two occasions when the heart blood of guineapigs was inoculated into culture media with a view to the isolation of organisms that might have brought about the death of the animals which had succumbed during attempts to habituate them to a life at high temperatures. In most cases it was found that the blood and organs had been invaded by coliform or other intestinal bacteria. On the two occasions referred to the medium appeared to remain sterile, but microscopic examination of a clot of blood in the tube revealed the presence of numerous spirochaetes. They were present in pure culture, and had evidently, like the bacteria, invaded the blood and organs from the intestine. The cultures were the starting point of a long series of investigations, this being the first occasion on which an intestinal spirochaete had been obtained in pure culture. It was most readily cultivated in defibrinated guineapig or rabbit blood, but it also grew readily in a variety of liquid media to which some blood had been added. Liquid media without blood was less favourable though growth occurred, while on the surface of solid media the spirochaetes quickly reverted to the coccus forms which, however, gave rise to spirochaetes again in more favourable media. In subcultures the forms which appeared first, were short organisms resembling the cholera vibrios. These increased in length till finally the delicate spirochaetes appeared. Sometimes forms like fusiform bacilli were present. The spirochaetes themselves varied considerably in length, forms measuring 100 microns being sometimes seen. The optimum temperature was 37° C. but growth occurred, though less rapidly, at lower temperatures. In media containing blood the spirochaetes produced melanin the method of identifying which is described in detail. Attempts to produce infection in animals did not lead to definite results. The predilection of the spirochaetes for blood throws light on the presence of these organisms in cases of haemoptysis and dysentery. It is generally agreed that in bronchial conditions, when blood is present in the sputum, the spirochaetes are most numerous, and that they become fewer or disappear when blood is no longer present. The same condition of affairs has been noted in dysentery. It would seem unreasonable to ascribe the presence of blood to the spirochaetes. The blood in these cases evidently acts as a good culture medium. The whole question of buccal, intestinal, pulmonary and other similar spirochaetoses is discussed. The conclusion reached is that the spirochaetes are chiefly inoffensive commensals or symbionts, which may, when in contact with already damaged tissues and in the presence of other organisms of a proteolytic nature, acquire pathogenic properties and cease to be entirely inoffensive.

C. M. W.

GOMES (J. M.) & PESSÔA (S. B.). Um caso de dyarrhéa dysenteriforme grave provocadas por espirochetas. [**Dysenteric Diarrhoea provoked by Spirochaetes.**]—*Ann. Paulist. Med. e Cirurg.* 1926. Nov.–Dec. Year 14. Vol. 17. No. 11–12. pp. 167–169. With 4 text figs.

A man, 42 years of age, began to suffer with diarrhoea, abdominal pain and tenesmus on January 27th, 1926. This continued and the motions later contained blood. No amoebae were seen, but emetine was given, without any benefit. Antidysenteric serum produced severe urticaria, but no change in the intestinal condition. By the middle of March he was having 16 actions daily and was emaciated and exhausted. Another examination of the stools revealed ova of trichocephalus, no amoebae, but enormous numbers of spirochaetes. He was given treparsol (0·25 cgm. daily) and in a few days there was great improvement. He continued the treparsol for 45 days and was then apparently cured. In mid October the dysenteric symptoms returned and again spirochaetes were found, this time together with larvae of *Strongyloides stercoralis*. The taking of treparsol was again followed by complete disappearance of spirochaetes and clearing up of the symptoms.

H. Harold Scott.

BROUGHTON-ALCOCK (W.). **A Spirochaetic Infection with Necrosis and Perforation of Ileum.**—*Proc. Roy. Soc. Med.* 1927. Mar. Vol. 20. No. 5. pp. 704–706 (Sect. Trop. Dis. & Parasit. pp. 22–24).

A case is described in which death presumably resulted from perforation of one of several ulcers which were found post mortem about five to six feet above the ileo-caecal valve. On section of one of these ulcers it was found that there was a spirochaetal infection of the tissues of the ulcer. A streptococcus was also present. The author inclines to the view that the spirochaetes were in some way responsible for the condition which led to the death of the patient.

C. M. W.

CERQUEIRA (Augusto). Modificação á technica de coloração do Treponema pallido e de outras espirillaceas. [**Staining of *T. pallidum* and other "Spirillaceae."**]—*Brasil-Medico.* 1927. Mar. 19. Vol. 41. No. 12. pp. 258–262. [30 refs.]

The author advocates the following modification of Hollande's method for staining spirochaetes.

1. Fix the film in absolute or 90 per cent. alcohol for one minute. 2. Pour off the alcohol and when dry cover with the modification of Hollande's solution (chemically pure tannic acid 5 gm., glacial acetic acid 4 cc., absolute or 90 per cent. alcohol 50 cc., distilled water 50 cc.); warm gently for 30 to 60 seconds till steam rises. 3. Wash rapidly in running water. 4. Pour on basic carbol fuchsin of Ziehl and again warm till steam rises for 10 to 20 seconds. 5. Wash and dry.

C. M. W.

YAKIMOFF (W. L.). Modifikation der Spirochätenimprägnation nach der Methode Fontana-Tribondeau. [**Modification of the Fontana-Tribondeau Method of Staining Spirochaetes.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Mar. 8. Vol. 102. No. 1–3. pp. 89–90.

The following fluid is used. Glacial acetic acid 2 gm., carbolic acid crystals 2 gm., formalin 2 gm., tannin 5 gm., alcohol 50 cc., distilled water 40 cc. Some of the fluid is heated to boiling point in a test tube and then poured on to the dry film, which is left till the liquid cools. It is then washed in water and treated with the ammonia silver nitrate (5 per cent.) solution.

C. M. W.

VERVOORT (H.). Pseudo-spirochaeten en zweepdraden. [**Pseudo-spirochaetes and Flagella.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 102–105. With 12 figs. on 3 plates. [9 refs.]

An illustrated article demonstrating the resemblance of detached bacterial flagella to spirochaetes and the need for recognition of this fact in identifying spiral organisms in culture media. (See NOGUCHI, this *Bulletin*, Vol. 23, p. 601).

C. M. W.

BACIGALUPO (Juan). Indice morfológico de identificación de las espiroquetas. **[Morphological Index of Spirochaete Identification.]**—*Semana Méd.* 1927. Jan. 13. Vol. 34. No. 2 (1722). pp. 84–85.

——. Indice morphologique d'identification des spirochètes.—*C.R. Soc. Biol.* 1927. Jan. 28. Vol. 96. No. 3. pp. 215–216.

The conclusion is reached that the morphological index described by FROILANO de MELLO for the identification of spirochaetes is of no practical value (see this *Bulletin*, Vol. 23, p. 115).

CATANEI (A.). Sur la durée de l'immunité dans la spirochétose expérimentale des oiseaux. **[Duration of Immunity in Experimental Spirochaetosis of Birds.]**—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 53–55. [1 ref.]

Inoculation of canaries with the *Spirochaeta gallinarum* leads to infection followed by recovery and an immunity which persists for at least 20 or 21 months. The immunity resulting from inoculation with a Brazilian or an Algerian strain protects the birds against infection with another Algerian strain.

C. M. W.

KRITSCHEWSKY (I. L.) & TSCHERIKOWER (R.). Das Beladungsphänomen in Bezug auf *Spir. icterogenes.*—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 81. [In Russian pp. 74–81. Refs. in footnotes.] [v. this *Bulletin*, Vol. 23, p. 599.]

## RAT-BITE FEVER.

FUTAKI (K.), TAKAKI (I.), TANIGUCHI (T.), OHSUMI (S.), ISHIWARA (K.) & OHTAWARA (T.). **Demonstration of the Spirochaeta causing Rat-Bite Fever.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 133–137.

The authors give an outline of the symptomatology of rat bite fever and a description of the organism with a view to justifying their name *Spirochaeta morsus muris* and their claim that it is a spirochaete and not a spirillum. In support of their contention they state that the organism is flexible, has only one (not more) flagellum at each end, is weakly refractile, has not the movements of a bacterium, has during division a long intermediary thread, becomes dissolved in 5 minutes by bile or 10 per cent. sodium taurocholate, produces alopecia and clouding of the cornea when injected into guineapigs in large doses and produces symptoms similar to those caused by undoubted spirochaetes. They conclude that the organism belongs to the genus *Treponema*.

C. M. Wenyon.

SOESILO (R.). **The Occurrence of** *Spirillum muris*, **var.** *morsus muris*, **Specific Cause of Rat-Bite Disease, in Rats at Batavia.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1926. Pt. 4. pp. 503–509. With 1 plate. [17 refs.]

The paper records a series of experiments made with a strain of *Spirillum minus* recovered from the blood of a *Mus rattus* in Weltevreden. Guineapigs, rats and mice were infected. Of 7 guineapigs bitten by 4 infected rats 3 died of the infection, while 3 guineapigs out of 4 which were bitten by infected mice contracted the infection. The morphology of the organism is described and this is in conformity with the accounts of other observers. It may be noted that a single flagellum or a bunch of flagella occurs at each end of the organism while flagella arising from the central part of the body were also seen. The author is definitely of the opinion that the organism is a spirillum.

C. M. W.

HARDY (T. L.) & SAVERY (H. Mearns). **A Case of Rat-Bite Fever.**—*Lancet.* 1927. Apr. 2. pp. 703–704. With 1 chart. [5 refs.]

A farmer who had been severely bitten by a rat became suddenly ill with headache, nausea, severe limb pains and weakness two months after the bite, the wound of which had completely healed. There was a faint blotchy erythematous rash. He quickly recovered but had a similar attack 8 days later and he continued to have these attacks every 8 days. They were not associated with any inflammation of the scar of the healed wound nor with adenitis. After the 7th attack he was given 0·3 gm. of novarsenobenzol. An 8th attack occurring 9 days later was similarly treated, after which there was no recurrence. In view of the clinical history and response to treatment the authors feel justified in making their diagnosis.

C. M. W.

CADBURY (Wm. W.). **Rat-Bite Fever in China.**—*China Med. Jl.* 1926. Dec. Vol. 40. No. 12. pp. 1204–1207. [11 refs.]

Two cases of rat-bite fever occurring in the vicinity of Canton showed typical symptoms and from both cases the causative spirillum was isolated. These appear to be the first properly diagnosed cases from China, though others showing the clinical picture of the disease have been noted previously.

C. M. W.

DA MATTA (Alfredo). Sodoquiose ou sodoku ? [**Cases of Sodoku.**]—*Brazil-Medico.* 1926. Oct. 23. Year 40. Vol. 2. No. 17. pp. 233–235 ; also in *Sciencia Med.* 1926. Nov. 30. Vol. 4. No. 11. pp. 566–572.

A description of 2 cases of rat bite fever in one of which the diagnosis was confirmed by the discovery of spirilla in gland puncture material. Both responded to treatment with injections of 914.

GIGLIOLI (George). **Clinical Notes on a Case of Sodoku from Cat Bite in British Guiana.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 504–505.

The case was in a man 27 years of age. A single organism was found in blood taken from a recently appeared papule.

COSIMO (Basile Vito). Un caso di Sodoku nella Somalia Italiana. [**Case of Sodoku in Italian Somaliland.**]—*Ann. di Med. Nav. e Colon.* 1927. Mar.-Apr. Year 33 (Year 5). Vol. 1. No. 3–4. pp. 175–179. With 1 text fig.

Description of a case of rat bite fever in a native of Italian Somaliland. There was a short incubation period of 4 days. The causative organism was discovered in the primary lesion.

GERBASI (Michele). Contributo clinico ed etiologico alla conoscenza del sodoku. [**Case of Sodoku.**]—*Pediatria.* 1927. Feb. 1. Vol. 35. No. 3. pp. 139–146. With 1 coloured text fig. [19 refs.]

A detailed description of a case of rat bite fever in a child of 8 at Palermo. The causative organism was found in smears of an enlarged gland.

RUSSO (Vincenzo). Ancora un caso di Sodòku in Sicilia. [**Another Case of Sodoku in Sicily.**]—*Policlinico.* Sez. Prat. 1927. Jan. 3. Vol. 34. No. 1. pp. 8–9.

A case of rat bite fever in Sicily in which diagnosis was established by the finding of spirilla in smears from the lesion.

C. M. W.

# INFECTIOUS JAUNDICE.

BUCHANAN (G.). **Spirochaetal Jaundice.**—*Med. Res. Council. Spec. Rep. Ser. No. 113.* 64 pp. With 5 figs. & 23 figs. on 13 plates. 1927. London: H.M.S.O. [4s.]

In a previous paper (this *Bulletin*, Vol. 22, p. 181) the author described the investigations carried out by him in connexion with an outbreak of infectious jaundice in certain Scottish mines. The present report gives a more detailed account of this outbreak and others subsequently investigated. It does not supply much new information, but serves as a useful record of the clinical and laboratory investigations which may be undertaken when occasion arises and of the methods of carrying them out. In addition, very useful historical summaries are given, as also a long list of references to the literature of the subject. Finally a series of plates, six of them coloured and made by the author himself, illustrate the jaundice and petechiae seen in a severe fatal form of the disease, the haemorrhages in the stomach, mesentery and glands of a human case, the appearance of the lesions in an opened up guineapig, leptospira in the kidney and urine of the rat and blood of the guineapig and the character of the growth of leptospira in culture media, etc. This very complete and instructive report should be in the hands of all those who are likely to have to deal with outbreaks of infectious jaundice or other diseases which may be due to leptospira infection.

C. M. Wenyon.

i. GALLOWAY (David J.). **Epidemic Jaundice** (*Leptospira icterohaemorrhagiae*).—*Malayan Med. Jl.* 1926. Dec. Vol. 1. No. 4. pp. 1–5.

ii. MALAYAN MEDICAL JOURNAL. 1926. Dec. Vol. 1. No. 4. pp. 5–6. **Fonr More Cases of Leptospirosis.**

i. The first paper describes 5 cases of leptospiral jaundice in the Federated Malay States. Three of the cases were of the haemorrhagic type and terminated fatally. The haemorrhage was from the stomach, bowel or kidneys, while petechiae occurred on the skin. From 2 of these cases by inoculation of blood or urine into guineapigs, leptospira were recovered. The 4th and 5th cases belonged to another category, as the disease, though severe, was not accompanied by haemorrhages. The 4th case was that of a Japanese gentleman who after recovery left for Japan, where 2 months after the commencement of his illness leptospira were found in his urine. Six weeks after his return from Japan the daughter became ill, and showed symptoms similar to those which characterized her father's attack. The 5 cases illustrate the extreme variation in the severity of the disease of which there appear to be two main categories—the ictero-haemorrhagic and the simple icteric.

ii. The second paper describes 4 further cases. They were all of a mild type and did not show even jaundice. In all cases leptospira were recovered by inoculation of guineapigs. A number of other similar cases were seen, but as leptospira were not isolated they are not recorded. It is evident that leptospirosis is a common disease in the Malay States.

C. M. W.

KOUWENAAR (W.). **Spirochaetosis Febrilis, a Tropical Leptospirosis.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 159–178. With 3 figs.

The author gives a detailed account of the diseases of Deli in which leptospira have been found. Three are distinguished, viz., spirochaetosis febrilis simplex, fever cases without jaundice or haemoglobinuria; spirochaetosis febrilis cum ictero, fever cases accompanied by jaundice and more or less resembling Weil's disease; blackwater fever, fever cases attended with haemoglobinuria. The description is based on 58 cases of the first condition, 32 cases of the second and 1 of the third, in all of which leptospira could be demonstrated. The cultivation method of diagnosis has so far improved that now the organism can be isolated from the blood in more than 60 per cent. of the cases. Inoculation of guineapigs reveals leptospira in only a small percentage. Thus in a series of 13 cases this method was positive only twice. Taking all due precautions to avoid contamination leptospira were found in the urine of 69 per cent. of the first type of disease, in 85 per cent. of the second and not in the 1 case of the third type. The symptoms which may occur in the first two types are general body pains, fever, increased pulse rate, injected conjunctivae, rash, haemorrhages, digestive troubles, tenderness and enlargement of the liver, albuminuria, leucocytosis, adenitis. Apart from the jaundice the two types differ from one another chiefly in the general severity of the disease. In the mild cases the fever lasts for 2 to 15 days, while in the severe cases it is more irregular and relapse is likely to occur. All the symptoms noted are not necessarily present. Thus in the 58 cases of the first type the urine showed no albumin in 9, febrile albuminuria 25, severe nephritis 24. In 32 cases of the second type 8 showed febrile albuminuria and 24 true nephritis. It would thus appear that the first two types merge into one another, the second type, which closely resembles Weil's disease and has a mortality rate of 20 per cent., being a severe form of the first.

As regards the cases with haemoglobinuria 2 such were seen in the course of an epidemic of the first two types, but leptospira were found in only one of these. The cases correspond in many ways with the spirochaetosis febrilis cum ictero, with the exception that severe blood destruction occurs. The organism in all these conditions is the *Leptospira pyrogenes* of Vervoort. It appears in the blood during the first days of illness and disappears after about 6 days. It appears to select the liver as the chief object of its attack. At the end of the second week, destruction of the organisms commences in the body, some of them being excreted by the kidneys. The relation of the Deli leptospirosis to dengue and Japanese seven-day fever is considered. Whether it is actually Weil's disease is an open question which can only be decided by further observation. It is possible that in epidemics of Weil's disease, atypical cases without jaundice and with little or no pyrexia, have been overlooked. At present it appears best to regard the various forms of spirochaetosis febrilis as a distinct entity till its immunological relations to other leptospiroses have been determined.

C. M. W.

JORGE (Ricardo). Des ictères épidémiques. [**The Epidemic Jaundices.**] *Bull. Office Internat. d'Hyg. Publique.* 1926. Nov. Vol. 18. No. 11. pp. 1283–1294. [1 ref.]

The paper discusses the subject of infectious jaundice which it is pointed out is not necessarily due to leptospiral invasion, for there is evidence that certain outbreaks are caused by organisms of the paratyphoid group. The symptomatology and epidemiology of leptospiral jaundice or Weil's disease is discussed in connexion with an epidemic which occurred in Portugal in 1914, before the causative leptospira had been discovered by the Japanese workers. There were noted at Setûbal between the end of August and the end of October, 30 cases of which 9 were fatal. A month later the disease appeared at Cezimbra where there were 7 cases, 1 of which was fatal. As regards infectious jaundice, the cases studied by SARRAILHÉ and CLUNET at Gallipoli during the war, and a similar series of cases investigated by CANTACUZÈNE in Roumania during the campaign of 1917 are mentioned. ANIGSTEIN, during the autumn of 1921, investigated an outbreak in Poland, the town of Rovno, where there occurred 250 cases in three months, being most heavily affected. No leptospira could be discovered, but of 67 cases diagnosed as epidemic jaundice, the blood of 57 gave positive agglutination for paratyphoid organisms, chiefly those of the *Bacillus aertrycke* type. The epidemic jaundice of paratyphoid origin is essentially a benign disease, there being no tendency to haemorrhage so characteristic of the more serious Weil's disease. There undoubtedly exists still another type of infectious jaundice the etiology of which is not at present understood. C. M. W.

WOLLENBERG (R. A. C.). **The Status and Relationships of Infectious (Epidemic) Jaundice in the United States.**—*Ann. Clin. Med.* 1926. Sept. Vol. 5. No. 3. pp. 297–304. [16 refs.]

The writer discusses various outbreaks of infectious or epidemic jaundice which have been reported in the United States. One noted by SYMMERS in 1920 from Bellevue Hospital involved 16 cases of acute haemorrhagic jaundice of which 9 died. Clinically and anatomically these cases resembled yellow fever and Weil's disease. Various other outbreaks, including that in New York State in the winter of 1921–22, in which over 700 cases were noted, were of a milder type. From one case reported by SAILER (1925) a guineapig was inoculated with the urine and was found to be passing leptospira in the urine two weeks later. In 1922 WADSWORTH and his co-workers reported the accidental infection of a laboratory worker with a culture of leptospira isolated from a rat [this *Bulletin*, Vol. 19, p. 561]. In the majority of these cases of infectious jaundice no etiological factor could be detected and it is obvious that the American epidemic cases recently reported vary considerably in severity from the European cases associated with the leptospira. In the American cases high and prolonged fever, swelling and tenderness of the liver and spleen have been but rarely observed and secondary fever not at all. Should these cases be eventually found to be due to leptospiral infection, as has been suspected, the organism must be a less virulent strain or other factors must make the people more resistant. C. M. W.

CLEYNDERT, Jr. (P. C.). **Spirochaetosis icterohaemorrhagica.**—*Nederl. Tijdschr. v. Geneesk.* 1927. Jan. 29. 71st Year. 1st Half. No. 5. pp. 562–567. With 1 text fig.

A man 33 years of age was admitted to hospital with fever, jaundice, enlargement and tenderness of the liver and other symptoms, on the 11th day of an illness which was of sudden onset. His serum tested against *Leptospira icterohaemorrhagiae* agglutinated it and caused lysis.

Two days after admission there was considerable improvement but death took place suddenly on the following day. No leptospira were found post-mortem, but the serological investigation is regarded as sufficient evidence of a leptospiral infection. Enquiry showed that the man had been accustomed to bathe in a certain swimming bath and it was found that two other persons who frequented it had suffered from a similar illness. The serum of one of these was strongly positive when tested against the leptospira. That of the other was feebly positive. It was further elicited that a swimming instructor had died earlier in the same year from a condition diagnosed as purpura fulminans. The swimming baths in question were supplied with water from a canal into which sewage drained while the washings from a neighbouring cattle market found their way into the bath. Rats abounded in the locality and an examination of these revealed leptospira, as also in the canal and bath water. More than half the adult rats examined in Gouda, S. Holland, were found to harbour the organism.

C. M. W.

GUTHRIE (A. Cowan). **A Case of Spirochaetosis Icterohaemorrhagica.**—*Lancet.* 1927. Feb. 12. pp. 337–338. With 1 text fig. [1 ref.]

A woman of middle age shortly before her return to England from Egypt began to suffer from general malaise. On the journey home she did not improve, while a tendency to sickness supervened. When seen on 23rd April, 1925, there was no fever but there was a yellowness of the skin which was definitely jaundiced on 27th April when catarrhal jaundice was diagnosed. On 28th and 29th April there was some improvement, but on the evening of 29th April there was a recurrence of sickness, the vomit being dark in colour. On 1st May the patient was very ill and she died on 3rd May. The statement is made that spirochaetes were discovered in enormous numbers when blood collected on 1st May was examined. [A drawing shows a number of threads with hooked ends lying amongst red blood corpuscles and leucocytes. Whether this is intended to represent a single field of the microscope is not stated nor is any information given as to the method of examination of the blood. The discovery of " enormous numbers " of spirochaetes in " blood collected " rather suggests that the spirochaetes were blood filaments. No other instance of such a heavy blood infection by leptospira has been recorded.]

C. M. W.

BATES (J. E.). **Leptospirosis icterohaemorrhagica (Weil's Disease) with Report of a Fatal Case.**—*Canadian Med. Assoc. Jl.* 1926. Dec. Vol. 16. No. 12. pp. 1466–1475. With 1 text fig. [108 refs.]

The paper gives a very careful and detailed description of a fatal case of Weil's disease in Canada, *Leptospira icterohaemorrhagiae* being found abundantly in the kidney after death. A point of special interest is that the patient first became ill 8 months before his fatal attack.

He had pain over the liver and was jaundiced for 2 weeks. He returned to work but continued to have occasional pain in the right side. Five months later he was admitted to hospital for this condition but no diagnosis was made. Later on his fatal attack commenced with pains all over the body, to be followed in 2 days by a violent chill and sweating. On the fifth day he became jaundiced, while on the seventh he had severe pain in the right chest and on admission to hospital stated that he had vomited some black material. During his stay in hospital he became lethargic while the jaundice deepened. He coughed up small amounts of red currant jelly sputum and appeared very toxic. Later the liver decreased in size while the jaundice diminished. He appeared to be progressing satisfactorily till the 21st day when he had a chill lasting 3 hours, after which he became very weak and died on the 23rd day. At autopsy there was acute hepatitis, necrosis of the liver, icterus, acute parenchymatous degeneration of the kidney and acute suppurative nephritis.

It is suggested that the intermittent character of the disease extending over 8 months points to the possibility of the man being a carrier of the organism. Though cases of infectious jaundice have been recorded from Canada this is the first case in which diagnosis was established by the discovery of leptospira.

C. M. W.

HAYMAN, Jr. (J. M.) & LYNCH, Jr. (Frank B.). **Spirochaetal Jaundice in the United States.**—*Amer. Jl. Med. Sci.* 1927. Jan. Vol. 173. No. 1. pp. 80–89. With 1 text fig. [25 refs.]

A record of a case of Weil's disease in a Russian labourer in Pennsylvania. Leptospira were found in the blood which also produced the characteristic disease in guineapigs with presence of organisms in the kidneys. This is the fifth case with discovery of leptospira to be recorded from the United States.

C. M. W.

BURGER (G. C. E.). **Spirochaetosis icterohaemorrhagica.**—*Nederl. Tijdschr. v. Geneesk.* 1927. May 7. 71st Year. 1st Half. No. 19. pp. 2460–2463. With 1 chart in text. [5 refs.]

A case of Weil's disease in a soldier, in which the diagnosis was serologically and bacteriologically proved, but which otherwise offered no special features. The mode of infection remained uncertain.

The author thinks that many mild cases are still overlooked in Holland and that accordingly the disease is not such a fatal one as it would appear from the clinical material published so far.

W. J. Bais.

TIMMERMAN (W. Aeg.). Serumbehandeling bij de ziekte van Weil. [**Serum Treatment in Weil's Disease.**]—*Nederl. Tijdschr. v. Geneesk.* 1927. Mar. 26. 71st Year. 1st Half. No. 13. pp. 1572–1577. [23 refs.]

The author leads up to certain remarks he makes on the serological treatment of Weil's disease by giving an historical summary of the serology and other aspects of leptospiral infections. As regards the treatment he believes that immune rabbit serum injected intravenously in a dose of 30 cc., repeated if necessary, will materially increase the chance of recovery. The cases with bad prognosis appear to be those who have ingested water, as in the case of swimmers and drowning persons, and in such it is advisable not to be too sparing of the serum.

C. M. W.

SCHÜFFNER (W.) & SIEBURGH (G.). Zur mikroskopischen Frühdiagnose von Leptospirosen (Weilsche Krankheit, Gelbfieber u. a.). [**Early Diagnosis by Microscope of Leptospiroses.**]—*Muench. Med. Woch.* 1926. Nov. 19. Vol. 73. No. 47. pp. 1977–1978. [10 refs.]

—— & ——. **For the Early Microscopical Diagnosis of Leptospirae (Weil's Disease), Yellow Fever, and Others.**—*Jl. Trop. Med. & Hyg.* 1927. Feb. 15. Vol. 30. No. 4. pp. 48–49.

——. Zur mikroskopischen Frühdiagnose von Leptospirosen.—*Muench. Med. Woch.* 1927. May 20. Vol. 74. No. 20. p. 857. With 2 text figs.

The papers give the details of the method of triple centrifugation of blood of guineapigs for the demonstration of leptospira.

With a syringe charged with citrate solution 2 to 3 cc. of blood are drawn by heart puncture. After mixing with the citrate solution (which is a 20 per cent. solution to the quantity of one-tenth the volume of the blood) transfer to a centrifuge tube is made and the mixture centrifuged for 5 or 8 minutes at 1,500 revolutions. This throws down the white and red blood corpuscles. The supernatant plasma in which already leptospira can be more easily seen than in the original blood, is pipetted carefully into another tube and centrifuged at 1,500 revolutions for 10 minutes. The bulk of the platelets are thus deposited. The supernatant fluid is again removed to a fresh tube and centrifuged at double the original speed—3,000 revolutions—for 30 minutes.

By direct examination of the fluid at the various stages, the author has shown that definite concentration takes place, so that in the final deposit the leptospira are 800 times more numerous than in the same volume of the original blood and can readily be seen with the dark field if thin preparations are made. As many as 8 leptospira occur per field. The author has not yet had an opportunity of testing the method in human infections, but should it be applicable in these cases, it would simplify the early diagnosis of Weil's disease.

In the third paper there are reproduced two microphotographs illustrating the result obtained by the triple centrifugation method. In this case the blood was taken from a guineapig infected with the leptospira of yellow fever. The first microphotograph shows a field of a Giemsa stained film of the normal uncentrifuged blood of the animal. A single leptospira is seen. It is noted that such a picture is obtained only in one of every fifty fields. The second shows a field of a film of the deposit after centrifuging. About fifty leptospira are easily seen.

A further improvement in the method is given. After the second centrifuging has been carried out, saponin to a concentration of 1 in 1,000 or 1 in 2,000 is added to the plasma. This does not affect the leptospira in any way, but assists in removal of the blood platelets which tend to obscure the organisms.

C. M. W.

THEILER (Max) & SELLARDS (Andrew Watson). **The Relationship of *L. icterohaemorrhagiae* and *L. icteroides* as determined by the Pfeiffer Phenomenon in Guineapigs.**—*Amer. Jl. Trop. Med.* 1926. Nov. Vol. 6. No. 6. pp. 383–402. [7 refs.]

A very carefully conducted series of experiments in which 70 guineapigs were used, was designed to test the relationship of *Leptospira icteroides* (Brazilian strain Palmeiras No. 3.) to two strains of *Leptospira icterohaemorrhagiae* isolated from Boston rats. It was found that animals which had been actively immunized against the former were completely protected against the latter and vice versa. The results constitute strong evidence of serological identity of the three strains. They do not afford any additional evidence regarding the relationship of *L. icteroides* to yellow fever, especially since the connexion of Weil's disease and yellow fever is not properly understood. The possibilities are too radical for detailed discussion, the extremes being that Weil's disease and yellow fever may be etiologically identical or that the leptospira may have no etiological relationship to yellow fever.

C. M. W.

SABRAZÈS (J.). Recherches sur la séro-agglutinabilité des spirochètes. Cholérine à spironèmes. [**The Sero-Agglutinability of the Spirochaetes. Cholerine with Spironemas.**]—*C.R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. pp. 1347–1349. With 1 text fig. [1 ref.]

Cases of mixed infection with organisms of typhoid or paratyphoid and Weil's disease have been diagnosed, because in addition to the isolation of bacilli of the enteric group the serum agglutinated *Leptospira icterohaemorrhagiae.* The author put up the serum of known typhoid and paratyphoid cases, in the stools of which numerous spirochaetes occurred, as also the serum of a case of cholerine with heavy spirochaetal infection and no other known organisms, against *Leptospira icterohaemorrhagiae.* In no case was there any agglutination. This fact is in favour of the conclusions reached regarding the mixed infections.

C. M. W.

WALCH (E. W.) & SOESILO (R.). Vergelijkend serologisch onderzoek van te Batavia geïsoleerde en eenige andere Leptospira-stammen. [**Comparative Serological Investigation of Strains of Leptospira isolated at Batavia and elsewhere.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 84–98. [14 refs.]

Three strains of leptospira isolated in Batavia, one from a case of what appeared to be Weil's disease, and two from rats, were tested serologically against 6 antisera, viz., antiserum " Krommenie " made by injecting rabbits with a human strain of *L. icterohaemorrhagiae* from Holland, antiserum " Baltimore " from an American rat strain, polyvalent Weil-antiserum of Noguchi, antiserum " F " from an atypical Dutch rat strain, antiserum " Baermann " from Vervoort's *Leptospira pyrogenes,* antiserum " Yellow Fever " from Le Blanc's strain of *L. icteroides.* The 3 Batavian strains proved to be closely related to one another but showed no relation whatever to any of the others.

It is noted that no leptospira could be isolated from 7 cases of jaundice one of which showed the clinical symptoms of Weil's disease, from 4 cases of haemoglobinuric fever and 23 cases of fever of short duration.

C. M. W.

SARDJITO (M.) & POSTMUS (S.). Onderzoek naar het voorkomen van leptospirae onder de rattenbevolking van Weltevreden. [**Occurrence of Leptospira among the Rats of Weltevreden.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 73–83. [15 refs.]

Between the 25th November, 1925, and 12th August, 1926, 23 *Mus decumanus* and 17 *Mus rattus* were examined for leptospira infection. Only 4 of the *M. decumanus* were found infected. It was noted that direct inoculation of kidney material into Noguchi's medium was more likely to give a positive result than direct microscopical examination of kidney emulsion or its inoculation into guineapigs.
C. M. W.

UHLENHUTH (P.) & HERRMANN (Erika). Neue Untersuchungen ueber die Umwandlung der *Spirochaeta pseudoicterogenes* (Wasserspirochaete) in die *Spirochaeta icterogenes* (Erreger der Weilschen Krankheit). [**Conversion of** *S. pseudo-icterogenes* (**Water Spirochaete**) **into** *S. icterogenes.*]—*Med. Klin.* 1927. Apr. 22. Vol. 23. No. 16 (1167). pp. 599–601. [7 refs.]

The writers call attention to ZUELZER's observation that a strain of water leptospira after a year's cultivation in rabbit serum water became pathogenic to guineapigs and corresponded in every way with the leptospira of Weil's disease [this *Bulletin*, Vol. 21, p. 262.] They have extended these experiments and record one in which a water leptospira which had been cultivated for several years in rabbit serum water became pathogenic to guineapigs after being grown for 3 passages in normal wild rat serum. The lesions in the guineapig were like those caused by the Weil's disease leptospira.

Curiously enough, when inoculated to a guineapig at the 6th passage, it failed to infect, as also did another water strain in its third passage in normal rat serum. In another experiment, young wild rats in which the reticulo-endothelial system had been blocked with Indian ink were inoculated intraperitoneally with a water strain. In 12 of 20 animals the leptospira found their way to the kidneys. The kidneys of these rats, which were killed on the 10th day, were emulsified and the mixture inoculated into 8 guineapigs, 6 of which died with all the symptoms and lesions of experimental Weil's disease. The infection was transmissible by subinoculation to other guineapigs. The authors have thus succeeded in making pathogenic a water strain of leptospira by passing it through young rats. The organism was isolated in culture from these animals, and it was found that serologically it had become distinct and was not influenced by an antiserum prepared from the original water strain from which it had been derived. Similarly its own antiserum did not influence the water strain. Inoculated from the liver of two of the infected guineapigs together with true Weil's serum, no infection resulted, whereas when mixed with the serum of the original water strain or normal rabbit serum infection occurred. Thus the water strain which had become pathogenic to guineapigs, had not only changed its serological characters, but had assumed those of the leptospira of Weil's disease. It is clear therefore, that the view that rats obtain their infection from water leptospira, has some experimental basis. How this transformation occurs in nature further researches must explain. It has to be assumed that the water strains do not necessarily have to pass through the rat to become pathogenic to man, for in certain human cases, no connexion with rats has been found, infection appearing to take place directly from water.
C. M. W.

KABESHIMA (Tamezo). **On the Filterability of** *Spirochaeta icterohaemorrhagiae.—Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 139–141.

Cultivating *Leptospira icterohaemorrhagiae* in a medium consisting of sterile tap water (pH 7·1) to which is added in a quantity of 5 to 10 per cent. defibrinated rabbit's blood heated at 56° C. for one hour, attempts were made to pass the organisms through various Chamberland and Berkefeld filters under slow negative pressure or, as in the case of experiments with half the Berkefeld filters, no pressure. In all, 106 Chamberland, and 24 Berkefeld filters were used. The conclusion reached is that the leptospira of Weil's disease does not pass through a filter which does not permit the passage of *Bacillus prodigiosus.*

C. M. W.

DEN HARTOG (J. C.) & VAN STEENIS (P. B.). Een geval van verworven haemolytischen icterus met miltextirpatie bij een inlandsch fuselier. [**Case of Haemolytic Jaundice with Splenectomy in a Javanese Soldier.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 5. pp. 684–705. With 6 figs. (2 coloured) on 2 plates. [16 refs.]

Though haemolytic jaundice is a rare condition in the Dutch East Indies one of the authors has seen 5 cases during 2 years. A case in a Javanese soldier is described in detail. He suffered from fever, jaundice and enlargement of the spleen and liver. There was a positive Wassermann reaction and evidence of cirrhosis of the liver. The haemoglobin index was 23. The spleen was removed and soon after the haemoglobin index mounted to 60 and thereafter fluctuated between this figure and 80. The case was also complicated by malaria, a severe attack occurring about 5 weeks after the splenectomy. It is thought that the condition was due to a staphylococcus infection, for a pure culture of *S. pyrogenes aureus* was obtained from the removed spleen and again from the blood the day after the onset of the severe malarial attack, which responded quickly to quinine treatment. The septic condition was treated by intravenous injections of a 5 per cent. solution of gentian violet, 30 cc. being given twice a week.

C. M. W.

PRAUSNITZ (Carl) & LUBINSKI. Untersuchungen ueber das " Schlamm-Fieber." [**Investigations into Mud Fever.**]—*Klin. Woch.* 1926. Oct. 29. Vol. 5. No. 44. pp. 2052–2054. With 2 text figs. [2 refs.]

During the floods which inundated large tracts of land in Silesia, there occurred in the summer of 1925 numerous cases of a febrile condition which in many respects resembled mild Weil's disease without jaundice. In certain districts the cases numbered many thousands. The onset is sudden, with various bodily pains, and the temperature quickly rises, to remain continuous for 5 to 7 days. A fall to normal then occurs, to be followed after one or two days by relapse, and in some cases a second relapse. A rash in the form of red papules occurs in some instances. There is marked conjunctivitis and photophobia. Jaundice was never observed. Attempts to discover the cause of the disease were not attended with much success. Animal inoculations and direct blood examination yielded no information. Blood cultures for isolation of leptospira showed in certain cases motionless structures resembling spirochaetes, while one of the cultures 10 days later was found to contain active spirochaetes of the Weil's disease type. It is admitted that these results are unsatisfactory. The nature of the disease is discussed at length. An insect borne infection such as dengue appears to be excluded, the authors inclining to the view that the disease is water-borne. They think that it may be actually leptospiral in nature.

C. M. W.

i. INADA (Ryokichi). **On Nanukayami (Seven Day Fever) in Japan.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 113–115.

ii. TAKAGI (Sampei), SEGI (Moto-O) & SAWADA (Taku). **Researches on Akiyami.**—*Ibid.* pp. 117–119.

i. The information given in the first paper regarding *Leptospira hebdomadis* appears to be the same as that published by KOSHINA, SHIWOZAWA and KITAYAMA in 1924 (this *Bulletin*, Vol. 22, p. 176).

ii. The writers of the second paper agree that two types of *L. hebdomadis* occur but show that types of intermediate virulence are also found. They are disinclined to regard the types as distinct species, but believe that the variations in virulence are due to external factors such as environment, strength of virus and other undetermined conditions.

C. M. W.

VINZENT (René). Isolement et culture de spirilles et de spirochètes des eaux. **[Isolation and Culture of Spirilla and Spirochaetes of Water.]** —*C.R. Soc. Biol.* 1926. Dec. 17. Vol. 95. No. 37. pp. 1472–1474.

By filtering waters through Chamberland F and $L^3$ filters, the author has succeeded in isolating in pure culture three spirochaetes. The first is the well-known water leptospira. It was cultivated in rabbit serum water. It is noted that if the medium prepared with drinking water gives a poor growth the addition of a small quantity of sterilized sewage water, will remedy the defect in the medium. Of the two other spirochaetes, one is named *Spirochaeta aurantia.* It measures 5 to 20 microns in length, and has 4 to 12 turns. It grows well in a tube of sloped nutrient agar filled with sterile water, the optimum temperature being 33° C. In 24 hours growth can be detected at the top of the liquid. After several days, the growth collects at the bottom in orange coloured masses. The organisms remain alive for several months. On the surface of agar orange colonies are produced. Other media were tried but these were not so satisfactory as the first mentioned. The third spirochaete cultivated is named *Spirillum penetrans.* It grows well in the medium noted above. In young cultures it measures not more than 4 to 6 microns and has two or three turns. In older cultures it reaches 10 microns with four or five turns. It is 0·3 microns thick, has a rigid body and like *S. aurantia* is very rapid in its movements. It is provided with flagella. Another organism which resembles it in every way save for the absence of flagella and lack of motility has also been cultivated.

C. M. W.

DIMITROFF (Vladimir T.). *Leptospira biflexa* **(Wolbach and Binger, 1914. Emend. Noguchi, 1918).**—*Jl. Infect. Dis.* 1927. Apr. Vol. 40. No. 4. pp. 508–515. With 1 plate. [26 refs.]

Water samples were tested for the presence of leptospira by HINDLE's faecal culture method. The water (about 100 cc.) was distributed in Petri dishes and to each was added sterile faecal emulsion to give a concentration of about 1 to 2 per cent. of faeces. The dishes were kept in the dark at room temperature and examined weekly for five weeks. It was found that *Leptospira biflexa* occurred in 69 per cent. of all water samples examined, and in 87·5 per cent. of drinking water from 47 cities. Pure cultures of leptospira were obtained by filtration through Berkefeld filters. The procedure was to fill the glass mantle with 10 to 15 per cent. sterile faecal emulsion and allow this to gravitate through for about an hour. The faecal emulsion is then poured off and replaced by the impure faecal culture of the leptospira. A loopful of the filtrate from the nipple of the filter was transferred to a sterile medium consisting of 1 to 2 per cent. faeces in tap water every five minutes for 2 hours. After 10 to 20 days incubation at 27° C. these cultures were examined for leptospira. When the organisms were established in the faecal medium 1 to 4 per cent. of rabbit serum was added in successive subcultures till finally transfer was made to pure rabbit serum in tap water. For satisfactory staining of the organisms the following method is recommended. Culture is spread as a very thin film on a clean slide and exposed to the vapour of 1 per cent. osmic acid. It is then air-dried and immersed for 30 minutes in Fontana's solution (acetic acid 1, formalin 2, distilled water 100). After thoroughly washing in water the slide is placed for 4½ hours in a mixture of 1 cc. stock solution of basic carbolfuchsin and 1 cc. of saturated alcoholic solution of gentian violet in 50 cc. distilled water. The film is then thoroughly washed in water for 5 to 30 minutes and dried.

Attempts to infect animals with *L. biflexa* failed. An immune serum prepared from it, did not agglutinate nor protect animals against *L. icterohaemorrhagiae* while a serum prepared from the last named did not agglutinate *L. biflexa.*

C. M. W.

SCHÜFFNER (W.) & MOCHTAR (Achmad). Versuche zur Aufteilung von Leptospiren-stämmen, mit einleitenden Bemerkungen ueber den Verlauf von Agglutination und Lysis. **[The Differentiation of Leptospira Strains. The Course of Agglutination and Lysis.]**—*Cent. f. Bakt.* I. Abt. Orig. 1927. Feb. 5. Vol. 101. No. 6–7. pp. 405–413. With 1 text fig. [5 refs.]

For the serological differentiation of leptospira the authors have elaborated a technique which gives more precise results than that hitherto employed. It involves the addition to quantities of a culture of leptospira of serum in varying concentrations. The authors have found the white porcelain plates made with a series of hollows, such as are used for mixing paints, very suitable. After mixing culture and serum in the hollows, the plate is covered and left for 16 hours, when observations are made by taking platinum loopfuls after mixing and making direct observation with the dark field, under a low power objective so as to avoid the necessity of a cover glass. It will be found that with the higher concentrations of serum (1 in 10 to 1 in 100) the leptospira are agglutinated. As the dilution becomes greater (1 in 100 to 1 in 500) there is less intense agglutination while lysis of the leptospira becomes evident. With still higher dilutions (1 in 500 to 1 in 10,000) agglutination entirely ceases, and lysis becomes almost complete. From dilutions of 1 in 10,000 to 1 in 100,000 lysis ceases, both this phenomenon and agglutination not occurring. During the whole of this process a certain, but small proportion of the organisms are not involved and move about in the liquid around the agglutinated clumps or those undergoing lysis as the normal individuals in the original culture in the control preparation. As the dilutions at which lysis ceases are reached, the normally moving organisms rapidly increase in number till, as noted above, all continue to move as in the control preparation. If at the height of the lytic phenomenon, when only a comparatively small number of survivors exist, a subculture is made, the resulting culture consists of leptospira evidently derived from these resistant forms. Nevertheless, if with this culture the serological test is repeated the same sequence of events occurs, showing that the leptospira derived from those which withstood the lytic action of the serum are on the whole just as susceptible as the organisms in the original culture. The authors believe that by observing the effect of sera on leptospira by the above method and charting the results of agglutination, lysis and survival in separate columns and indicating the intensity of each phenomenon (+ to + + + +) it will be possible to identify the leptospira with some degree of certainty.

C. M. W.

LÉPINE (Pierre). Présence de spirochètes libres dans l'eau de conduite de Beyrouth. Etude et culture. **[Free Spirochaetes in Tap Water at Beyrouth.]**—*C.R. Soc. Biol.* 1927. Feb. 11. Vol. 96. No. 5. pp. 320–322. [1 ref.]

The spirochaete referred to in the title had the characters of the leptospira which is commonly found in water.

C. M. W.

# YELLOW FEVER.

LASNET. Compte rendu des cas de fièvre jaune observés en Afrique Occidentale Française, de juillet 1926 à février 1927. (Rapport de Marchoux.) **[Record of Cases of Yellow Fever seen in French West Africa between July 1926 and February 1927.**—*Bull. Acad. Méd.* 1927. May 3. 91st Year. 3rd Ser. Vol. 97. No. 18. pp. 560–568. With 1 map in text.

During 1926 yellow fever occurred in both the British colonies of the Gold Coast and Nigeria. In the former there were 26 cases with 12 deaths and in the latter 10 cases with 7 deaths. It is remarkable that the French colony Dahomey, which lies between the British colonies, and the Upper Volta which borders the Gold Coast have had very few cases—2 at Porto-Novo with one death and 2 at Gaoua, both of which were fatal. In Senegal, on the other hand, where there is a bigger white population, there were 34 cases with 29 deaths. Of the 34 cases 16 were in Syrians and 18 in Europeans. In addition, there were 19 suspicious cases with 12 deaths. They were not included in the returns because of doubt as to the diagnosis. The first case, referred to in another review, was that of a Syrian from Kaolack who died on July 15th. Nothing further happened till October when further cases occurred. They were directly connected with the arrival by ship, the "Madonna," at Dakar of a convoy of 200 Syrians, mostly new comers to Africa. Of these 50 went to Kaolack, where they remained 2 or 3 days before being sent along the Thies-Kayes railway. These Syrians were badly housed without hygienic precautions, mixed with the natives and had no protection against mosquitoes. On October 15th one of them was taken seriously ill at Gossas and died on the 18th. Jaundice and anuria were the chief symptoms. There was no black vomit, but the autopsy confirmed the diagnosis of yellow fever. From October 20th to the middle of November, the convoy from the ship supplied 6 other cases with symptoms which left no room for doubt as to the nature of the disease. Of the total of 16 cases amongst the Syrians, only 4 were in persons who had resided in Africa more than a year. Similarly amongst the Europeans there were 18 cases, 14 of which were in comparatively new arrivals. The distribution of the cases in Senegal is of interest. There were 3 foci, viz., Saloum, Diourbel and Rufisque. In the first Kaolack supplied the first case, and probably the first of the "Madonna" series. In the second Diourbel had 4 cases in Europeans, and it is possible that the 3 Syrian cases at M'Baké came from the same town. The third focus was the most important, there being 8 cases in persons who had not left the town for several weeks. Stegomyia was abundant at Rufisque at that season, and occurred also in the other foci.

Laboratory work yielded no information as to the etiology of the disease, though it substantiated the diagnosis of yellow fever. Tissues were examined by the American mission at Lagos and the diagnosis was confirmed.

As regards prevention certain suggestions are made for the future. It is becoming increasingly evident that there must be a native reservoir of infection and that it is impossible to expect for many years to come that French West Africa will be completely sanitary and that Stegomyia will be extinct. This being so; (1) the sanitation of the endemic foci must be vigorously undertaken; (2) a mosquito-proof room must be insisted upon in all buildings occupied by white people, so that any case of suspicious fever can be at once screened; (3) the water supply must be regulated; (4) a stock of wire gauze, protective cages, chemicals for disinfection, etc., must be stocked ready for use; (5) the medical officers must be alert; (6) a school of instruction must be established at Dakar for all who may have to deal with the disease; (7) the population must be instructed in the various areas; (8) vaccination by Noguchi's vaccine must be continued, but not at the expense of anti-larval measures which are the basis of prophylaxis against yellow fever.

C. M. Wenyon.

AITKEN (A. Blair) & SMITH (E. C.). **An Analysis of the Cases of Yellow Fever which occurred in Lagos, Nigeria, during 1926, with Notes on the Differential Diagnosis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 530–551. With 7 charts & 1 map in text. [1 ref.]

The paper describes in detail the clinical and pathological features of eight cases of West African yellow fever, which were brought into the European hospital at Lagos during the period July to November 1926. This careful account of the cases is of special interest in view of the vexed question of the actual nature of the disease and its relation to the yellow fever of the New World. Of the eight cases, seven occurred in Lagos and one in Oshogbo, a town 200 miles inland by rail. The Lagos cases, with the exception of two, occurred either in a limited area of the township or in various harbour craft. There is evidence that the two exceptions also contracted their infection in the limited area though they fell ill elsewhere. Of the eight cases, five were fatal. A study of the cases has shown that there is no distinctive feature in the early stages. Even up to the first or second day yellow fever and malaria may resemble one another, pyrexia commencing with headache and rigor, followed by backache, general malaise, nausea and perhaps vomiting being common to both. When the patient is not seen until the third day of illness and the stage of stasis is well established, the diagnosis in most cases will be obvious. Yet in the present series owing to the mildness of some of the cases and the slow development of the disease, diagnosis was not established till later. Blood examination may enable a diagnosis to be made, but a negative finding if quinine in considerable doses has been taken does not necessarily exclude malaria. Even a positive find of malarial parasites must be accepted with reservation, as diagnostic of malaria, unless a heavy infection is present. Of great importance is the rapid increase in albumin in the urine within one or two days, yet in some cases the albuminuria does not exceed that in malaria. Icterus is as a rule an inconspicuous feature till a late stage is reached. If a patient is seen within 24 hours of the onset, and presents a picture of a malarial attack of some severity, associated with an absence of parasites suspicion should be aroused if nausea and vomiting persist, and if a rapidly developing albuminuria occurs there will be confirmation. A decline in the pulse rate with continued pyrexia will follow while the icterus will deepen. Put briefly pyrexia and heavy albuminuria in an endemic area of yellow fever is highly suspicious. The account of yellow fever as it occurs in the New World by the late H. R. CARTER in BYAM & ARCHIBALD'S *The Practice of Medicine in the Tropics*, shows that the African cases differ in several respects. They evolve more slowly, the liver is appreciably enlarged even in the acute fatal cases and haemorrhagic signs, appearing first in the gums, have been by no means a constant feature. CARTER's claim that malaria may generally be differentiated by the facies even in the very beginning—the first few hours—has not been the experience in Lagos.

As regards the pathological findings in the five fatal cases, these are carefully described and tabulated. It is noted that there is disparity between the findings and deviation in certain respects from the picture of yellow fever as given by authorities on the subject. It would be premature to set up a pathological standard of macroscopic and more particularly microscopic appearance of the disease in West Africa.

C. M. W.

LE FANU (G. E. H.). **Yellow Fever at Accra, September, 1925.**—*Gold Coast Rep. Med. & San. Dept. for Period Apr. 1925–Mar. 1926.* Appendix B. pp. 51–54.

The report describes three cases of yellow fever, of varying severity which occurred at Accra in April, May and September, 1925. They were treated with intravenous injections of N.A.B. and all three recovered. Not one of the three had any marked quantity of albumin in the urine, and in two only a trace was found. It would appear that the diagnosis might be the subject of discussion.

C. M. W.

REVUE DE MÉDECINE ET D'HYGIÈNE TROPICALES. 1927. Jan.-Feb. Vol. 19. No. 1. pp. 16–17.—[**Discussion of Laurent's Paper "La fièvre jaune dans le golfe du Bénin," in** *Rev. Méd. et Hyg. Trop.* **1926. Vol. 18. Nos. 5 & 6.**]

The three writers TANON, Marcel LÉGER and PHELAN disagree with the views expressed by LAURENT regarding the nature of yellow fever in the gulf of Bénin (*ante*, pp. 101–103). The assumption that the cases diagnosed yellow fever were actually malaria has no solid foundation and to substantiate the claim it would be necessary to demonstrate the parasites of malaria which were not present in the cases. LÉGER remarks that LASSÈGNE said of hysteria that it was a basket into which one threw all papers which one could not classify. For a very long time malaria had fulfilled this rôle in the colonies. It was a convenient label which was attached without sufficient discernment to all the febrile affections of hot countries. It should no longer be so; a diagnosis of malaria can be proved.

C. M. W.

i. CAZANOVE (F.). Considérations sur les cas de fièvre jaune observés au Sénégal en 1912. [**Cases of Yellow Fever seen in Senegal in 1912.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9 & Mar. 9. Vol. 20. Nos. 2 & 3. pp. 197–204; 286–295.

ii. COUVY (L.). A propos de la fièvre jaune.—*Ibid.* 1927. Mar. 9. Vol. 20. No. 3. pp. 295–299. [2 refs.]

i. The first paper describes in detail the history of 7 cases of yellow fever which occurred in Dakar in November 1912. In the previous year, on September 30th and October 2nd, there were two cases of the disease in Senegal. Following these, up to March 1912, there were 12 other cases 7 of which occurred in Dakar. Of the 14 cases 11 were fatal.

In August 1912, a doubtful case was noted at Kébemer, but there were 39 cases at various places before the end of the year. In September there were 6, in October 13, in November 17, in December 3. Of the 39 cases only 9 ended in recovery. Dakar contributed 11 cases and the present paper deals with 7 of these, 6 of which were fatal. The description of these 7 cases shows that the disease is of the type usually seen in Africa. It is noted that the post-mortem appearances were strikingly similar to those described by NOGUCHI from experimentally infected animals. The importance of early diagnosis from malaria is emphasized. If malaria is the cause parasites should be present; if quinine has been taken the drug should control the disease. A most important point is quantitative estimation of albumin in the urine. In severe malaria, the albumin may reach 0·1 to 0·2 centigrams; a quantity of 0·2 to 0·6 or 0·75 is inconclusive, but if it rises above this, the disease is yellow fever. Another important point is the redness of the face, combined with a sub-icteric tint of the forehead and the conjunctivae, which are injected. If the skin of the flank be rendered momentarily anaemic by pressure of the hand as the pale spots return to their original colour a transient subicteric tint will be noted. In addition there is marked mental anxiety even when the general symptoms are not severe.

As regards the epidemiology of the disease, it is noteworthy that the epidemics of 1911 and 1912 as also that of 1926 commenced after the summer, whereas those of 1900 and 1878 occurred in July, August and September. It would have been expected that the disease would occur at the end of the summer when there is the highest Stegomyia density. It is possible that the disease existed in milder form and unrecognized during the summer to appear as a more virulent type when the population was exhausted. Again it is possible that not enough is known of the bionomics of the Senegal Stegomyia, and its capacity for transmitting the disease.

ii. The second paper is an attempt to answer some of the questions raised in the first. The author does not agree that the 1926 outbreak was merely a winter one, for there was a fatal case in a Syrian at Kaolack in July 1926, while the cases noted at the end of October 1926 seem to have originated in the same Syrian colony. It is possible that a search would reveal the fact that other cases occurred between these dates. The winter of 1926 was a mild one, and the Stegomyia, which usually disappear in the winter, did not appear to be inconvenienced in any way and this seems to have been the experience throughout Senegal.

C. M. W.

NINAUD. Sur un cas de typhus amaryl traité par le sérum de Noguchi. [**Case of Yellow Fever treated by Noguchi's Serum.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 391–395.

**The paper describes the case of a man 26 years of age, who three months after his arrival at Rufisque in Senegal became suddenly ill on 23rd January with pains in the loins. An hour or two later there was a violent rigor, vomiting and anxiety. The temperature rose to 40·4° C. The next day there was no improvement. The epigastrium was tender and the vomit contained bile and was streaked. The urine was highly albuminous and a diagnosis of yellow fever was made. The following day vomiting continued, the material brought up being brown in colour and containing tobacco grain flecks. Noguchi's serum was then injected in two doses of 2 cc. and 48 cc. at 20 minutes interval. This was followed by a violent reaction after which there was improvement. Eight hours later there was**

a return of the symptoms, which continued. The facees contained black material. The following day (26th January) another dose of 50 cc. of serum was given, which was again followed by a reaction and improvement. On 27th January, after a bad night, slight subconjunctival jaundice was noted. A further dose of 50 cc. of serum was given. Again there was a reaction, followed by relative calm. On the morning of 28th January the patient appeared better but became worse and a fourth dose of 50 cc. of serum was given. After this the patient steadily improved and was regarded as convalescent on 30th January.

In spite of the absence of certain symptoms regarded as characteristic, the case is considered to be one of yellow fever and the serum absolutely specific.

C. M. W.

JUNIOR (Vianna). O phenomeno de Pfeiffer na febre amarella. [**Pfeiffer's Test in Yellow Fever.**]—*Brasil-Medico.* 1927. Jan. 15. Vol. 41. No. 3. pp. 51-55.

The cultivation of a strain of leptospira from a case of yellow fever in Bahia, brings to 16 the number of strains isolated from this disease by NOGUCHI and others. An opportunity was afforded of conducting serological investigations with the isolated organism and yellow fever convalescents. Pfeiffer's test was carried out with the result that it is demonstrated that yellow fever occurs not only in the capital Bahia, but also in the interior of the country.

C. M. W.

SELLARDS (Andrew Watson). **The Pfeiffer Reaction with Leptospira in Yellow Fever.**—*Amer. Jl. Trop. Med.* 1927. Mar. Vol. 7. No. 2. pp. 71-95. [17 refs.]

The author has investigated Pfeiffer's phenomenon in its relation to yellow fever and Weil's disease. The serum of eleven patients taken three-and-a-half months after recovery from yellow fever gave a negative reaction with both *Leptospira icteroides* and *L. icterohaemorrhagiae,* while the serum of two guineapigs immunized against *L. icterohaemorrhagiae* gave a positive reaction with both organisms. A striking and characteristic feature of leptospiral infections is the development and persistence of immune substances, which are readily demonstrable by the Pfeiffer phenomenon. The results furnish evidence of the identity of *L. icteroides* and *L. icterohaemorrhagiae,* and do not support the view that *L. icteroides* is the etiologic agent of yellow fever. If *L. icteroides* were the etiologic agent of yellow fever and identical with *L. icterohaemorrhagiae,* then there would be a possibility of an almost unlimited rodent reservoir of the virus. The occurrence of a negative Pfeiffer phenomenon in cases of undoubted yellow fever, shows that a negative reaction in the case of the West African disease would tend to confirm rather than refute the yellow fever nature of the disease. It becomes necessary to review the evidence of the susceptibility of animals to yellow fever, and to reconsider seriously the older view that the actual virus is in nature limited to man and the mosquito.

C. M. W.

SCHÜFFNER (W.) & MOCHTAR (Achmad). Gelbfieber und Weilsche Krankheit. [**Yellow Fever and Weil's Disease.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Apr. Vol. 31. No. 4. pp. 149–165. With 14 text figs. [10 refs.]

Employing about eighteen different strains of leptospira, including yellow fever strains, the authors have conducted an elaborate series of serological tests with a view to establishing the identity of *Leptospira icteroides*. The tests involved the use of specific antisera prepared in rabbits for Pfeiffer's reaction, cross immunity and agglutination. The results are set out in a series of tables and they indicate that it is impossible to differentiate the yellow fever strains from those of Weil's disease. Assuming that the two are identical, various possibilities regarding the relationship of leptospira to yellow fever suggest themselves, and these are discussed in detail. C. M. W.

HEITZMANN (Otto). Vergleichende pathologische Anatomie der experimentellen Gelbfieber-, Weil- und Sumatrainfektion. [**Comparative Pathological Anatomy of Experimental Yellow Fever, Weil's Disease and Sumatra Infection.**]—*Arb. a. d. Reichgsndhtsamt.* 1926. Vol. 57. pp. 48–63. With 3 text figs. [16 refs.]

The paper is the result of a detailed histological study of the changes induced in guineapigs by three types of leptospira—those of yellow fever, Weil's disease, and the Sumatra disease. The general conclusion reached is that all three organisms induce similar changes, the only differences noted being those of degree. There is agreement as regards blood destruction apart from the characteristic haemorrhages, the marked reaction of the reticulo-endothelial system towards the blood-invading organisms and red blood corpuscles and the parenchyma changes in the liver, kidneys, suprarenals and heart. With the Weil's disease organism there is more marked damage to the muscles, but this and other differences are indications of a gradation and have no bearing on the fact that an identical picture is produced by all the three strains.

C. M. W.

HOFFMANN (W. H.). **Yellow Fever as a Far Eastern Problem.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 143–157. With 4 maps in text.

Though the rapid eradication of yellow fever in S. America and the quarantine service in the American sea ports ensure the absence of any practical danger for the Far East, nevertheless so great would be the catastrophe of the importation of the disease that the scientific study of the problem should not be neglected by the Far Eastern authorities so that it would be possible to effect immediate isolation of the first imported and suspicious case, protection by serum of all possibly exposed to infection and institution of antimosquito measures. C. M. W.

RÜDER (F. B.). Prophylaxe und Therapie des Gelben Fiebers an der westafrikanischen Küste. [**Prophylaxis and Treatment of Yellow Fever on the West Coast of Africa.**]—*Deut. Med. Woch.* 1926. Aug. 20. Vol. 52. No. 34. pp. 1424–1426. [7 refs.]

Having visited Lagos in October 1925 and collected information regarding cases of yellow fever, the author discusses the disease and the possibilities of prophylactic vaccination and serum treatment. C. M. W.

DE MATTOS (Emygdio). Epidemiologia da febre amarella. [**Epidemiology of Yellow Fever.**]—*Sciencia Med.* 1926. Oct. 31. Vol. 4. No. 10. pp. 522–538. [1 ref.]

A historical account of yellow fever in Brazil and of the development of knowledge of the epidemiology of the disease.

C. M. W.

HOFFMANN (W. H.). Die Gelbfiebergefahr im Mittelmeer.—*Arch. Ital. Sci. Med. Colon.* 1926. Sept.–Oct. Vol. 7. No. 9–10. pp. 173–178.

——. Hygienische Betrachtungen ue ber das Gelbfieber in Afrika.—*Muench. Med Woch.* 1926. Dec. 10. Vol. 73. No. 50. pp. 2116–2117.

——. La profilaxia de la fiebre amarilla.—*Siglo Méd.* 1926. Dec. 18. Year 73. Vol. 78. No. 3810. pp. 598–599.

——. Gelbfieber als Weltproblem.—*Seuchenbekämpfung.* 1927. Vol. 4. No. 1. pp. 10–13.

# MALARIA.

FEDERATED MALAY STATES. **Annual Report of the Malaria Bureau for 1925.** [WILLIAMSON (K. B.), Malaria Research Officer.]—*F.M.S. Ann. Rep. of the Inst. for Med. Res. for the Year 1925.* pp. 14–23.

Anopheline larval distribution in relation to the pH of the water has been investigated. The numbers of larvae collected per 100 dips were as follows :—

| pH | No. of Plots. | *A. fuliginosus.* | *A. sinensis.* | *A. barbirostris.* | Total. |
|---|---|---|---|---|---|
| 6·6 | 5 | 23 | 13·7 | ·9 | 37·6 |
| 6·4 | 3 | 17 | 10·5 | 1·0 | 28·5 |
| 6·3 | 1 | 2·7 | 2·7 | — | 5·4 |

There appears to be complete cessation of development when the acidity is that indicated by pH 6 or a lower figure. Apparently acidity is equally detrimental to the rice crop as to larvae.

Experiments on the water of the Bukit Merah Reservoir suggest that larvae fail to survive in it because of lack of food. Its pH is usually a little below 6. It was found too that larvae of the anopheline species mentioned and of *A. vagus* bred freely in a ditch whose water had a pH of 5·3 to 5·6 but in which food was abundant. Other experiments were made on larva-destroying water-insects. These were not exactly identified, but a " large belostomid bug " was a very active destroyer. Of submerged plants, *Utricularia flexuosa* appears to limit anophelines to *A. sinensis* and *A. barbirostris* or to eliminate them altogether. The presence of other plants is considered. " Roasted Amang," a ferruginous residue, proved a fairly efficient larvicide, as did rubber oil. The latter, mixed with solar and crude oils, considerably increased their efficiency.

C. L.

WALCH (E. W.) & SOESILO (R.). **Investigation of a Malarial Epidemic in Tegal, during the First Months of 1926.**—*Meded. Dienst d. Volksgezondheid in Nederl-Indië.* 1927. Pt. 1. pp. 1–96. With 29 photos & 13 figs. (including 2 coloured folding maps & 1 sketch map). [7 refs.]

This characteristically thorough report is, in great part, necessarily of local interest only. It deals with parasite index, spleen index, rainfall, mortality, breeding places and house catches of anopheles, their dissection, the relation between them and malaria, and quinine distribution. The investigation was called for as the result of a malarial epidemic beginning in January 1926, the investigation being carried out from the middle of March to the middle of April. *A. ludlowi* was implicated as the chief vector, 2 per cent. infected as against 0·2 per cent. for *A. rossii.* The former was found breeding freely in the coastal zone, its breeding places having extended here as compared with a previous investigation ; yet the larvae were entirely absent from the town itself although the imagines were found distributed throughout it. A new fact is recorded in the discovery of *A. fuliginosus* breeding in salt water up to 17 parts per thousand. There is doubt as to the implication of *A. aconita,* which breeds in rice field and ditches.

It is advised that attention be first directed to the breeding places of *A. ludlowi* and that those of *A. aconita* be attacked only if the measures directed against *A. ludlowi* should fail in reducing the local malaria.

C. L.

SEVERN (A. G. Millott). **Malaria, and Malaria Prophylaxis in Formosa.**—*Caduceus Jl. Hongkong Univ.* 1926. Nov. Vol. 5. No. 3. pp. 219–226.

The writer spent a week in Formosa, by invitation of the Japanese Government, on his way home from Japan at the conclusion of the Interchange of Health Officers of the Far East organized by the League of Nations. He reviews the local conditions, particularly contrasting them with those of Hongkong. The three commonest anopheles in both places are *A. hyrcanus* var. *sinensis*, *A. minimus* and *A. maculatus*. In Formosa the first is said to be a vector of tertian and quartan malaria and the other two of subtertian. *A. hyrcanus* is by far the most widely spread species. Since 1897 the number of malarial cases *treated* has increased tenfold and the deaths have fallen to about a tenth. Apparently, in certain areas at least, blood examination is enforced and treatment compulsory for the infected. Notification and the use of mosquito nets are officially pressed and general prophylactic measures widely adopted.

C. L.

TIEDEMAN (Walter v. D.). **Malaria in the Philippines.**—*Jl. Preventive Med.* Baltimore. 1927. Jan. Vol. 1. No. 3. pp. 205–254. With 23 text figs.

The Philippine Health Service has stated that malaria accounts there for a morbidity of 301·9 per 100,000 of the population and for 14·3 per cent. of the deaths. In 14 deaths reported as malarial post-mortem examination by the author showed that only 5 were due to that infection. The work he reports covered two years and eight months and was varied and exhaustive. The population was poor, shifting, housed so badly that screening was inapplicable, and made little use of nets. Diagnosis was by at least 15 minutes' examination of a thin smear, of which 6,343 were searched with 17·8 per cent. of positives. Of the positives the percentages were 72·5 for tertian, 16 for quartan, 10·5 for subtertian and 1 for mixed infections. The parasite index was 30·3 in floating populations and 15·5 in comparatively fixed ones. The number of anophelines roughly follows the rainfall except in the case of the stream breeders, which appear after the flooded streams contract; yet toward the end of the dry season large numbers of the young of certain fish appear to control breeding temporarily. The anophelines concerned in transmitting malaria appear to be the seasonal stream breeders *A. ludlowii* and *A. minimus* and the amount of malaria transmitted is of economic importance. Tree holes and axils of palm and banana leaves did not furnish any larvae, nor did rice fields breed the main malaria conveyors. Much care was expended in an effort to test the effects of quinine but the results were rendered nugatory by the floating character of the population. Paris green as a larvicide appears to offer the best promise. " Some means of attracting mosquitoes to traps will have to be developed in order to do effective work for these small communities."

C. L.

WILSON (P. W.). Notes d'inspection sur la malaria parmi les émigrants de Port-de-Paix à destination de Cuba. [**Malaria among Emigrants leaving Haiti.**]—*Bull. Soc. Méd. d'Haiti.* Port-au-Prince. 1927. Apr. Year 1. No. 2. pp. 19–24.

Some 6,400 emigrants leaving Port-de-Paix, Haiti, for Cuba, who had passed a physical examination to eliminate the weakly, were examined for malaria parasites by the thick film method, modified according to BARBER and KOMP. The infected numbered 26 per cent. Of these, 80 per cent. harboured subtertian, 19 per cent. quartan and less than 1 per cent. tertian malaria. Few mixed infections were discovered. At first the examiners had identified *P. vivax* in a certain number of smears, but BARBER classed them as *P. falciparum* and that arrangement was acted upon afterwards. In these apparently healthy persons the number of heavy infections was surprising. Some showed 50 or 60 parasites per field, while 5 or 6 parasites per field were not uncommon. Of 277 children about 24 per cent. were infected.

C. L.

PRADO (Alcides) & PESSOA (Samuel B.). Ligeiras considerações sobre alguns pontos da epidemiologia e prophylaxia da malaria no Estado de S. Paulo. [**Some Points in the Epidemiology and Prophylaxis of Malaria in the State of S. Paulo.**]—*Sciencia Med.* 1927. Feb. 28. Vol. 5. No. 2. pp. 81–99. With 2 text figs. & 1 folding chart.

The conclusion of a well-documented paper is that the last ten-year period shows a certain parallelism between malarial deaths and rainfall, and that the former can be foretold from the latter. Banana cultivation, with the ditching involved, produces an excellent breeding ground for anopheles, a list of those found being supplied. Up to 14 years of age a palpable spleen is a better malarial index than the finding of parasites and is more readily produced by *P. vivax* than by *P. falciparum.* In adults the numbers with enlarged spleen and with parasites are about equal. Parasites are found throughout the year; quartan is the rarest, and tertian the commonest. It is held that antilarval measures, particularly one per cent. of Paris green in dust, and quininization should both be practised, and that *A. tarsimaculatus* is the best vector of tertian and *A. argyrotarsis* of subtertian malaria, although the latter is sufficiently capable of transmitting *P. vivax.*

C. L.

DAVIS (Nelson C.). *Anopheles pseudopunctipennis* **as a Malaria Transmitter in Northern Argentine Republic.**—*Amer. Jl. Trop. Med.* 1927. May. Vol. 7. No. 3. pp. 167–176. With 3 text figs. [6 refs.]

This paper covers a year's work in three villages in Chicligasta, Tucumán, Argentine Republic (lat. 27°20'S), with a mild climate. The rainfall is mainly in November to January, the last month showing, in 1926, a fall greater than that of the other two together. The anophelines present were *A. pseudopunctipennis, A. argyritarsis, A. albitarsis* and *A. tarsimaculatus.* BRÈTHES has recently renamed the second *A. rooti* and the fourth *A. evansi* [presumably on grounds of homonymy?].

Malaria reaches its apex in April. The captures of *A. pseudopunctipennis* in houses far exceed those of any other anopheles, the numbers in one village being 2,450 (of which 2,275 were females) as against 5 *A. albitarsis* and 3 *A. tarsimaculatus.* These numbers reach a high peak in March, a month before the malaria peak. Moreover, of 435 *A. pseudopunctipennis* dissected (431 stomachs and 313 salivary glands) twelve or 2·8 per cent. were infected. Judging by the pigment, the infections comprised both *P. vivax* and *P. falciparum.* No infection was found in the small numbers of other species captured in houses nor in the larger numbers (35) found attracted to animals. These comprised only one *A. pseudopunctipennis* [so that there was no appreciable attraction of this species away from man]. *A. pseudopunctipennis* bred in enormous numbers in the rivers in November and December and throughout the season in unshaded running water of all kinds, one of the worst breeding places being the moderately polluted village drain. The evidence, then, all points to *A. pseudopunctipennis* as the active definitive host. It is noted that in Panama the sanitary authorities have never attributed a major role in malaria to this insect, though PATERSON, in 1911, implicated it in northern Argentina, as has MÜHLENS.

C. L.

BARRETO (J. Sant'Ana). Index endémique du paludisme en Guinée Portugaise. [**Endemic Index of Malaria in Portuguese Guinea.**]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 280–285. [2 refs.]

Taking advantage of examinations rendered necessary by the finding of a case of sleeping sickness in Portuguese Guinea and finding that there was dislike on the part of the native population to the puncturing of cervical glands, Barreto examined thick films of finger blood.

In 236 cases his findings were :—

| | | | |
|---|---|---|---|
| *Trypanosoma gambiense* ... | 1 | Mixed plasmodial infections | 5 |
| *Plasmodium falciparum* ... | 52 | *Microfilaria perstans* ... | 19 |
| *P. vivax* ... ... ... | 25 | *Microfilaria,* type ... | 2 |
| *P. malariae* ... ... ... | 4 | Negatives ... ... ... | 128 |

The trypanosome infection was indigenous.

Two localities were investigated separated by 100 km., one the suburbs of Bolama, the other Buba with huts scattered through the bush. In the former the parasite index in 51 children up to 15 years was 57, the actual numbers infected with *P. falciparum, P. vivax* and *P. malariae* being 23, 3 and 2, with one mixed infection; the splenic index was 18. In the latter in 103 children the parasite index was 41·7, with actual infections as above of 19, 21, 1 and 2; the splenic index was 27. In Buba is found *A. squamosus* to which is tentatively attributed the prevalence of *P. vivax,* while elsewhere the prevalent mosquitoes are *A. costalis* and *A. mauritianus.*

C. L.

BOYD (Mark F.). **The Tropical Splenomegaly of Strong and Shattuck.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 21–26. [4 refs.]

In Part I of the Medical Report of the Hamilton Rice Seventh Expedition to the Amazon [*ante* p. 324], STRONG, SHATTUCK and WHEELER discussed splenomegaly under the headings of malaria, undulant fever, kala azar, tubercle, syphilis, splenic anaemia, Banti's disease, Gaucher's disease, and the splenomegaly of Egypt. Apart from all these they held that there was a "tropical splenomegaly" which one of them had observed in North Africa, the Philippines, Singapore, China, India, Panama and other parts of Central America but nowhere so prevalent as in Amazonia. It is characterized by slow, painless, enlargement of the spleen, with irregular fever, digestive disturbance and some anaemia with, later, hepatic cirrhosis and ascites. In some districts it affects 50 per cent. of children. There may be first a leucocytosis with, sometimes, myelocytes; later a leucopenia. The large mononuclear leucocytes ranged between 5 and 18 per cent. Changes in marrow and spleen were also noted.

In comment Boyd, from some 4 years' experience in Central Brazil, does not agree that the writers have excluded malaria. He writes, "From the passages quoted it would appear that a large proportion of the cases they have diagnosed as 'tropical splenomegaly' present conclusive and indubitable evidence of present or past malaria infection," and that they have failed to prove their points.

C. L.

ROUKHADZÉ (N.). La stabulation du bétail, comme facteur de réduction du paludisme, dans certaines contrées d'Abkhasie (Géorgie). **[The Stabling of Animals as a Factor in the Reduction of Malaria in Georgia.]**—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 153–170. [14 refs.]

The investigation previously described [this *Bulletin*, Vol. 23, p. 561] has been continued. Discrepancies between text and tables make it difficult to determine exactly how long it was continued. In the former publication it was concluded that the relative immunity to malaria enjoyed by one of the villages investigated was to be attributed to stabling of animals. [It was indicated in comment that it was necessary to determine the distribution of anopheles in Georgian houses at all seasons and the relative distribution of these in animal houses and human habitations at the season of presumed infection before firm conclusions could be reached. This the present communication does not do. The human habitations were not searched, difficulties proving too great.] Anopheles were collected only in the animal houses and naturally showed a preponderance of animal blood. The writer's conclusions are that the villages concerned possess about the same number of mosquitoes but varying quantities of malaria, and house their animals to a different extent. In certain villages the malaria is inversely proportional to the head of housed animals, and proper housing of these is strongly advocated.

C. L.

ITALY: Ministero dell' Interno, Direzione Generale della Sanità Pubblica. [In Italian & French.] La malaria in Italia ed i risultati della lotta antimalarica (notizie epidemiologiche e profilattiche con prospetti statistici, diagrammi e cartogrammi dimostrativi). **[Malaria in Italy and the Results of Antimalarial Measures.]**—71 pp. With 16 plates (5 maps). 1924. Rome: Libreria della Stato.

This Report is issued by what may be described as the Ministry of Health of Italy. A series of clearly shaded maps and diagrams shows how steady was the fall in the incidence of malaria in Italy from 1900 to 1914, under the antimalarial measures which have been in regular force; and how the War, interfering with these, lead to an increase in the incidence of infection. The well-known Italian antimalarial legislation and organization are described with a summary of Italian experiments showing the efficacy of cinchonine in the treatment of malaria. The arrangements for subsidizing the issue of quinine—grants in money or kind—are described, as are the other prophylactic measures, such as peripatetic laboratories and ambulances, sanitary stations, sanatoria, bonifications great and small, and antilarval measures. The amount of State money spent on these measures is great, and a diagram shows in what a striking general inverse ratio over a period of years is this total to the malarial incidence.

C. L.

BASS (C. C.). **The Passing of Malaria.**—*New Orleans Med. & Surg. Jl.* 1927. Apr. Vol. 79. No. 10. pp. 713–717.

This historical survey, with no intention of being complete, points out how MORTON, in 1697, accurately described the malarial fevers epidemic in London, as also in England and Wales, while SYDENHAM, in 1726, gave a most complete description of the intermittent fevers prevalent throughout England and part of Scotland the infection continuing in parts of England until 25 to 50 years ago. Nevertheless anopheles were sufficiently abundant to reproduce indigenous infection when the disease was reintroduced in mass during the great war. At the beginning of the nineteenth century Holland was scarcely less notoriously malarious than the Agra Romana; now the infection is strictly and mildly focal. A hundred years ago, Rochefort and the mouth of the Gironde in southern France were intensely malarious; today the disease is practically unknown. The same holds for Wurtemberg and the Harz Mountains in Germany, and, in North America, for low-lying valleys in Minnesota and Michigan and round the Great Lakes, Between 1800 and 1850 New York and Philadelphia and their surrounding country was intensely malarious. Twenty years ago the infection was serious round Baltimore. At the time of the Civil War it was the largest single cause of death in the Southern United States, haemoglobinuria and coma being common. The recent decline has been most marked. In New Orleans 30 or 40 years ago large numbers of malaria cases were treated. Twenty years ago cases were always to be found in every ward of the New Orleans Charity Hospital with which Bass was connected, and, less than that period since, he remembers seeing 16 quinine abscesses in that hospital at the same time. At the present day, not only are there no cases originating in New Orleans, but very few come in from the surrounding country. Since in many places malaria is no less or has increased, for what reasons has it receded in the areas mentioned? The causes are put in this sequence. First, advance in civilization, that is in clearance and drainage of land for agriculture and industry; the diffusion of knowledge of the part played by mosquitoes and the increased protection employed against them; and finally the extensive and intelligent use of quinine particularly in reference to disinfestation and not merely to the elimination of clinical symptoms. Such a line of treatment is typically exemplified in the United States Standard Treatment —with which the name of Bass himself is so closely connected. In reply to a discussion and speaking of the *proper use* of quinine Bass said.

" There is probably no country in the world where quinine is used to as good advantage and where there is as little misuse of it in the treatment of malaria as in this country. Unnecessary hypodermic or intravenous administration of the drug is limited to the work of a comparatively small number of enthusiasts and the unreasonably excessive doses are also not used by a great many physicians."

C. L.

SOUTHERN MEDICAL JOURNAL. 1927. June. Vol. 20. No. 6. pp. 460–492. With 4 charts & 1 map.—**Symposium on Malaria.** [CUMMING (Hugh S.), BOYD (Mark F.), HARDENBERGH (W. A.), HOFFMAN (Frederick L.), BARBER (M. A.), KOMP (W. H. W.) & HAYNE (T. B.), HAYNE (T. B.), SMILLIE (W. G.), LEPRINCE (J. A.), WELCH (S. W.), ABERCROMBIE (T. F.), UNDERWOOD (Felix J.), DOWLING (Oscar), TAYLOR (H. A.), PUCKETT (Carl), BISHOP (E. L.), SAPPINGTON (H. O.) & GRANT (H. G.).].

At the twentieth Annual Meeting of the Southern Medical Association much interesting discussion occurred. Surgeon General Cumming held that the eradication of malaria was now only a matter of refinements in economy and put certain questions such as whether the mosquito should be attacked in pool or house, what was the control influence of quinine, what species of mosquito matter? Boyd referred to the diversity of practice in collecting data during a malaria survey, and proposed a scheme which should render comparable the results of different surveys. Hardenbergh related experience with waste motor oil mixed with " Kresol Dip. No. 1 " which cost, to buy and apply, 5·75 cents. a gallon, spread well and was an effective larvicide. Larvae had lived in a flask for two weeks under a heavy coating of his best waste oil. Oil in dirty water was unsatisfactory. Hoffman wondered whether malaria was a factor inhibiting cancer in tropical lowlands. He quotes extensively from S. P. JAMES'S work [this *Bulletin*, Vol. 23. p. 804]. Barber, Komp, and Hayne dealt with methods of estimating malaria endemically, history, mortality records, spleen index, parasite index, consumption of quinine and incidence among a definite section of the populace. Hayne described the results of a house-to-house survey. Smillie gave further particulars regarding the Gantt impounded waters [this *Bulletin*, Vol. 24, p. 256]. Control of *A. quadrimaculatus* was incomplete in part of the area for about a month, and about that region malaria appeared. It is essentially a pond breeder and is accordingly implicated as the vector in this case. Le Prince indicated certain problems in the improvment of drainage and the need of county health officers attacking more strenuously the malaria problem. The other papers dealt with local malarial problems in various parts.

C. L.

ARCHIVOS BRASILEIROS DE MEDICINA. 1927. Mar. Vol. 17. No. 3. (Numero Especial de Impaludismo : Fasc. I.) [**Special Malaria Number.**] pp. 143–250. [COUTO (Miguel), MOREIRA (Juliano), FIALHO (Abreu), ROXO (Henrique), MALAGUETA (Irineu), DUQUE (Henrique), COUTINHO (Eugenio), PIRES (Waldemiro), PÓVOA (Hélion) and PIZA (Wladimir).]

Couto holds that in subtertian malaria methylene blue (5 cc. of 1 per cent. solution) should supplement quinine. Moreira deals with the vexed question of neuropsychoses and points out that to attribute these to the presence of a concomitant malarial infection is not correct. There must be antecedent or existent typical clinical symptoms, exclusion of other factors, the finding of plasmodia, and cure by the specific drug. Fialho, treating of ocular manifestations which are believed to be present in 15 to 20 per cent. of cases, lays particular stress on ophthalmic migraine, with scintillant scotoma, hemianopsia, nausea and vomiting. He agrees with Moreira regarding the need of care in attributing manifestations to malaria. Roxo associates with malaria four types of mental confusion, asthenic, stupid, hallucinatory and acutely delirious. His reasons do not appear to be stated in summary or original. Malagueta deals with the clinical diagnosis of malaria and holds that the laboratory, after repeated examinations, serves to confirm the clinical as the sounder method. Duque deprecates the attempt to systematize the administration of quinine. Each case must be treated on its merits. He, too, looks upon methylene blue as equally effective with quinine. Either drug may be given for *P. vivax*; both should be given for *P. falciparum*. If *P. vivax* infection is resistant to quinine, quinidine may be substituted. Coutinho writes that prognosis depends on the kind of parasite and its numbers, and on the duration of infection. The risk of relapse is held to be slight when treatment is well conducted. In children, prognosis is difficult, in old age, graver; pregnancy introduces an uncertain element. Pires notes that those with general paralysis are improved only in their mental symptoms; the basis of pathological anatomy and the humoral reactions are unaltered; he states that tabetics should be submitted to malarial infection. Póvoa and Piza give prominence to haemoclasia as the cause of the malarial paroxysm. It accompanies and does not precede the protein shock caused by the liberation of merozoits.

C. L.

HODGSON (E. C.), VARDON (A. C.) & SINGH (Zorawar). **A Preliminary Note on a Quick and Simple Test for the Differentiation of Malaria from Kala-Azar, Enteric and other Fevers.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 779–784. [2 refs.]

The writers, coming upon a paper advocating "Linzenmeier's technique" for diagnosis and prognosis of acute inflammation, and testing this for themselves on cases other than inflammatory, noted some striking results which merit full investigation. The test is a gravity precipitation of four parts of blood drawn into a syringe containing one part of 5 per cent. citrate of soda solution. Into a glass, flat-bottomed, perfectly dry tube (60 mm. long, 5 mm. wide and marked at 6, 12, 18, and 24 mm. from the bottom) the mixture is poured to the 24 mm. mark and is allowed to stand. If the column of corpuscles shrinks to 18 mm. in less than half an hour there has been held to be severe inflammation, with the necessity of immediate operation. In testing this against kala azar, malaria, enteric fever, and tuberculosis it became, however, clear that these conclusions require modification in India, a point the consideration of which is reserved for a future paper; but the tests disclosed a "simple, quick and apparently reliable aid to the diagnosis of malaria from other fevers." In healthy men sedimentation was slow, the column never less than 23 mm. high after half an hour's standing, never so dark as in diseased conditions, and the supernatant fluid was cloudy and only a faint yellow. In abdominal abscesses the column became shorter than 18 mm. in about 10 minutes, and was very dark. In kala-azar (parasites being found on hepatic or splenic puncture) sedimentation was rapid, the column being nearly always less than 10, and once becoming as short as 4 mm., the fluid was clear and colourless or faintly greenish. In typhoid the column was 13 to 15 mm. high, the fluid a cloudy white, In tuberculosis the column was 6 to 10 mm. high and the fluid cloudy and pale yellow. In malaria the column varied in height from 5 to 22 mm. with an average of 12 in cases where plasmodia were found, while the supernatant fluid was markedly yellow—golden, greenish or reddish. This brilliant yellow was present in all cases, whatever the species of parasite, and in no other condition, and is characterized as a most striking phenomenon. It was more intense in those actually suffering from fever than in others, was found in one man who had had no fever for a year, but who developed an attack a fortnight later, and generally disappeared from the citrated plasma of those who had had a few days quinine treatment, but not till then. So far as the tests have gone the colour varies with the species, golden yellow with *P. vivax*, greenish yellow with *P. falciparum* and reddish yellow with *P. malariae.* The fluid gives a very faint violet with Van den Bergh's indirect test for bile pigment and no colouration with the direct test. Spectroscopically it does not show haemoglobin or methaemoglobin bands, but a broad one in the blue-violet part. Conclusive evidence as to the cause of the colour has not been obtained.

C. L.

RAETZ (Erico). Paludismo a cuatro mil metros de altura. **[Malaria at an Altitude of 4,000 Metres.]** *Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 481–482.

In the lead mines of Pumahuasi, at an altitude of 4,000 metres, ten cases of malaria (comprising all three forms and presumably microscopically established) were detected. They are described as absolutely intolerant of quinine, but benefiting immensely from intravenous injections of hydrochloride of hydroquinine, which they received in 0.3 gm. doses with a total of 15 gm. in a month.

C. L.

MANDELSTAMM (Moritz). Ueber die Fieberkurve im Anfangsstadium bei primärer Malaria tertiana. **[Fever Curve in Early Stage of Primary Tertian Malaria.]**—*Deut. Med. Woch.* 1927. Apr. 8. Vol. 53. No. 15. p. 618. With 2 charts in text. [1 ref.]

The writer has seen in Leningrad, for some years past, cases of tertian malaria, established either by blood examination or concluded to be such by their reaction to quinine. It is held that the period of appearance, March to May, precludes local seasonal infection. All had sojourned during the previous year in South-East Russia and had taken during the summer 0·5 to 1 gm. of quinine once a week, and it is concluded that this has produced the long incubation period which is the writer's justification for naming them primary attacks. The point which is emphasized is that the beginning of the temperature curve shows an irregularly continuous temperature, a point which is new to the author [see this *Bulletin,* Vol. 22, p. 54, &c.].

C. L.

CLARK (Herbert C.). **The Comparative Incidence of Gametocytes in Untreated and in Briefly Treated Malaria. A Preliminary Report.**—*Amer. Jl. Trop. Med.* 1927. Jan. Vol. 7. No. 1. pp. 15–20. [8 refs.]

From April to September, 1926, that is in the dry and beginning of the rainy seasons, Clark examined about the Caribbean Sea 7,201 thick films by the Barber and Komp modification of Ross's technique. The average time spent in examining a slide was one minute. The positives were 29·8 per cent., the village index being 19·7 and the labour index 41·1. More than half the labour examined represented men found off duty in labour camps and three of such men were infected for every man at work. Anophelism was marked. The parasite percentage was—*P. falciparum* 76·6, *P. vivax* 18, *P. malariae* 2·5, mixed 2·7. The gamete rate was 13.5, but abundant gametes were rare. Of 124 cases examined after intensive quinine treatment for a week, 45·9 per cent. showed gametes.

"It is my belief that the degree and promptness of gamete invasion of the peripheral blood stream following a brief, vigorous use of quinine in estivo-autumnal malarial fever is not very generally known and that the long period over which many treated cases show a persistence of gametes in the peripheral blood is also not widely understood."

C. L.

PEYROT (J.). A propos du paludisme. [**Concerning Malaria.**]—*Jl. Méd. de Bordeaux.* 1927. Jan. 25. Vol. 104. No. 2. pp. 51–59. [28 refs.]

In this summary of recent work on malaria the writer mentions that the French Ministry of Pensions is adopting as a distinction between primary malarial attacks and relapses, the finding of gametes, this being held as characteristic in the latter. [Readers of this *Bulletin* will remember that gametes have been found among the first forms to appear in mosquito malaria deliberately induced in England for the treatment of general paralysis.] The presence of febrile syphilis is mentioned in those who have had malaria and the possibility of confusing congenital malaria with congenital syphilis.

C. L.

PLEHN (A.). Ein chininresistenter Tropikastamm. [**A Quinine-Resistant Strain of Subtertian Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. pp. 210–211. [4 refs.]

A sailor, H., who had for 3 weeks been taking 1 gm. of quinine twice weekly suffered, in Karachi, from fever which is reported to have lasted for 20 days in hospital in spite of quinine given in four-day periods with a day's abstention. About a month later he entered hospital in Hamburg with vesicular and crescent forms of *P. falciparum.* Under quinine 0·5 gm. and beprochin [plasmochin] 0.05 gm., evidence of malaria disappeared within 4 days. It is not clear for how long the drugs were continued, but relapse occurred and parasites disappeared under "chinitren" and beprochin. Apparently crescents persisted in spite of these three drugs as well as peracrina—all in unstated doses. From H. 2 cc. of blood were injected intravenously into Ki, a paralytic who showed his first gametes eight days after the first trophozoits appeared.

A second similar injection produced no appreciable effect on fever or on the numbers of plasmodia. Both disappeared spontaneously without quinine. Be. had had tertian malaria injected previously, which spontaneously disappeared; he was injected from Ki, and showed trophozoits and gametocytes, then reinjected from another strain without obvious change, and in him too there was apparent spontaneous cure. Bng. was injected subcutaneously from Ki, on the same day as was Be. He got fever and was, apparently without blood examination, given 0·5 gm. of quinine on two days and was then injected intravenously and subcutaneously from H. on three occasions. He was apparently given a half-gramme dose of quinine by mouth occasionally; for example, there seem to have been taken six such doses between 13th February and 6th March. From Bng. La. was injected intravenously with 3 cc. of blood and became infected. He, on the contrary, received treatment intramuscularly as the bihydrochloride, on days one and two 1·2 gm., day three 0·6, nine and ten 0·6, fifteen and sixteen 0·6 and thereafter by mouth 0·3 gm. every fifth and sixth days. It seems unnecessary to continue the detailed statement. The cases cited show the sort of evidence on which the presence of quinine resistance is based.

C. L.

VAN DEN BRANDEN (F.). Recherches sur la malaria congénitale, faites au Congo Belge (Léopoldville). [**Congenital Malaria at Leopoldville, Belgian Congo.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 338–342. [8 refs.]

In 55 cases the blood of the mother, of the placenta, and of the new born child was examined. Of the 55 mothers, 31 were infected with plasmodia and 4 with microfilariae. In one case only was the placental blood found infected, and, in that, quartan parasites were identified, although the mother's blood contained numerous schizonts of *P. falciparum* only. In no case was the child's blood found infected. It is pointed out that these observations are contrary to those of BLACKLOCK and GORDON at Freetown (this *Bulletin.* Vol. 23, p. 130.)

C. L.

FOÀ (G.). Su di un caso di Malaria in neonata di 27 giorni. (**A Case of Malaria in an Infant 27 Days Old.**)—*Riv. di Malariologia.* 1926. Sept.–Dec. Vol. 5. No. 5–6. pp. 660–662. [12 refs.] [English summary p. 739.]

The mother showed *P. vivax* on 11th July and *P. falciparum* on 11th and 23rd August and 2nd September. The child was born on 31st August, and, on 27th September, had fever with clear chills, was pallid, had palpable spleen and liver and showed growing rings of *P. vivax* without gametocytes.

C. L.

DEMJANOW (G. G.). Ueber den Malariaausschlag. [**A Malarial Eruption.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Feb. Vol. 31. No. 2. pp. 89–92.

Demjanow, an assistant in Professor NISHIBITZKI's clinic at Krasnodar, Kuban, describes a petechial eruption in malaria. It affected principally the hypochondria but might also be found on the whole abdomen, the breast, neck, and inner aspects of the thighs and forearms. It was rose-red, symmetrical, sometimes grouped, and reappeared in relapses. At first diagnosis was clinical. When the microscope began to be used parasites were found in 75 per cent. of cases, 69 being subtertian and 6 mixed tertian and subtertian malaria. Two cases of comatose subtertian malaria had a typical purpura haemorrhagica lasting two weeks and disappearing with betterment in the condition.

C. L.

MESNARD, STEFANI & LE MEILLOUR. Un cas d'affection pulmonaire subaiguë simulant la tuberculose guéri par la quinine. [**Case of Pulmonary Affection simulating Tuberculosis, cured by Quinine.**] —*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 113–116.

A subacute pulmonary affection suggesting incipient tuberculosis (but with no bacilli found) accompanied by schizonts of *P. falciparum* in the blood cleared up rapidly under "quinine," 2 gm. daily, "half of it by mouth." It is held permissible to consider that the plasmodium was involved in the production of the centrally situated pulmonary lesion which was detected by ordinary means and confirmed by X-rays.

C. L.

REITANO (Riccardo). Contributo alla conoscenza delle alterazioni del sistema nervoso centrale nella malaria. [**Changes in the Central Nervous System in Malaria.**]—*Policlinico* Sez. Med. 1927. Feb. 1. Vol. 34. No. 2. pp. 49–59. With 1 text fig. & 4 figs. on 1 plate. [11 refs.]

A man of 35 was picked up on the public road and died shortly after admission to hospital, a diagnosis of left cerebral haemorrhage being made. The only microscopic lesions of moment were almost symmetrical softenings about the anterior limb of the internal capsule, that on the left being rather the more extensive. They had not the character of haemorrhages. Microscopically, the small vessels in the cerebral white matter generally were packed with plasmodia and pigment. Their endothelium showed granular and lipoid change as did the nerve cells in the frontal and temporal regions. In the subcortical frontal layer were circumscribed nodes of Dürck, always in relation to a capillary wall, not actually forming typical daisies but with a definite radiation from the vessel as centre. In the softened zones, cut vessels showed a network and, beyond this, careful search displayed necrotic, ill-staining areas with degeneration of nervous elements, perivascular lymphocytosis and fatty change.

C. L.

RUSSELL (E. V.). **A Case of Cerebral Malaria.**—*Jl. Roy. Army Med. Corps.* 1927. Mar. Vol. 48. No. 3. pp. 227–228.

A Lance-Sergeant, ill for 4 days with slight abdominal pain and a little vomiting, collapsed in bed and was taken to hospital, semi-concious, jaundiced, slightly cyanosed, incontinent. An acute abdomen was considered, but a film showed subtertian parasites in large numbers, Stimulants and a saline intravenous injection failed to bring back his pulse and he died four and a half hours after admission. The brain capillaries showed many, and the spleen enormous number of, subtertian parasites.

C. L.

BRESSOT (E.). Le masque appendiculaire de certaines formes de paludisme. [**Malaria simulating Appendicitis.**]—*Presse Méd.* 1927. June 4. Vol. 35. No. 45. pp. 707–708. [7 refs.]

During the last eight years, five patients have come under Bressot's care, apparently at Constantine, with symptoms of acute appendicitis having a sharp onset. There was acute abdominal pain, bilious vomiting, fever and abdominal tenderness particularly in the appendix region. Two refused operation, on recurrence of rigors were established as malaria by blood examination, and recovered completely under quinine. When, in the other cases, the abdomen was opened, the appendix was quite normal, and there was a striking hyperaemia of the intestinal wall which, it is said, appeared to affect the submucous coat of the end of the ileum and the large intestine. It is further stated that, in two, there were oedematous, ecchymotic, infiltrated plaques on the mucosa as big as a franc. In one, the mesenteric glands were enlarged. Four cases were infected with *P. vivax* and one with *P. falciparum.*

C. L.

GARRONE (Enrico). Perniciosa malarica a forma meningitica. [**Pernicious Malaria simulating Meningitis.**]—*Policlinico.* Sez. Prat. 1927. March 21. Vol. 34. No. 12. pp. 426–428. With 1 chart in text. [1 ref.]

The symptoms in question were rigidity of the neck, Kernig's sign and exaggeration of the patellar reflex, with mental dullness. Subtertian parasites were present in the blood, but not in excessive quantity. Oral and intramuscular quinine and cinchonine not relieving the condition during four days, a lumbar puncture was performed, with escape of fluid in a strong jet lasting for some time, and intravenous quinine was administered for four days. By this time recovery had taken place and administration by mouth was resumed.

C. L.

WALDORP (Carlos P.) & BORDO (Carlos A.). Las nefropatias en los palúdicos. [**Affections of the Kidneys in Malaria.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 368–377. [27 refs.]

Renal abnormalities in malaria are discussed. Simple albuminuria appears without symptoms except lumbar pain and shows itself with or immediately after the access, sometimes in as many as 50 per cent. of cases irrespective of form, disappearing under treatment. In subtertian malaria there may also be hyaline and granular casts. Parenchymatous nephritis is accompanied by degenerative changes of one kind or another, and by anasarca, oliguria, even haematuria, and abundant hyaline and granular casts. It may pass into amyloid degeneration. In connexion with this the writers draw attention to a rare condition [perhaps sometimes overlooked] reported by a few observers, namely acute anasarca in recent malaria without renal lesion. They describe an acute haematuric globulonephritis; quote a case by QUARELLI where there was intermittent chyluria coming on during accesses in a case of subtertian malaria, bilharzia and filaria being excluded; and mention necrotic nephritis. There are finally considered the pathological renal conditions continuing during malarial attacks or appearing in chronic malaria.

C. L.

i. MacQueen (John). **A Case of Rupture of an Enlarged Malarial Spleen.**—*Lancet.* 1927. Feb. 26. pp. 437–438.

ii. Altounyan (E. H. R.). **Splenectomy in Malarial Subjects.** [Correspondence.]—*Ibid.* Apr. 16. p. 844.

i. A boy of 15 was admitted to hospital at Jaffa having walked into the reception room from a carriage. He had been kicked in the abdomen, had collapsed and vomited. There was a history of recurrent attacks of fever. He walked bent, was pale and muddy in complexion, abdomen moved unnaturally. Diaphragmatic lesion and splenic rupture were considered. The condition worsening, laparotomy was performed. A central incision showed a large splenic tear and air was blowing in and out of the abdomen at the upper pole of the spleen. Suturing proved useless. Remembrance of the advice of a surgeon in Egypt that remóval of the enlarged malarial spleen was followed by 100 per cent. mortality suggested gauze packing, with only partial closure of the wound. This was removed on the third day and the wound completely closed. Some pus, however, collected, but, the wound reopening, was discharged and complete recovery followed.

ii. The writer catalogues his last ten splenectomies, 7 for malarial splenomegaly with two deaths, one for splenic anaemia with death, one for " splenomegaly " with death and one for torsion of the pedicle, simulating ovarian cyst, in a malarial spleen weighing 4 pounds. If there be extensive diaphragmatic adhesions the operation is most dangerous. He has no evidence that the excision is of lasting value to the patient, nor does he feel that there need have been anything other than innocent sucking of air into the subdiaphragmatic pouch in MacQueen's case. C. L.

Gonzalez Olaechea (Max). El signo de Pagniello en el paludismo [**Pagniello's Sign in Malaria.**]—*Crónica Méd.* 1927. Jan. Vol. 44. No. 763. pp. 17–18.

Since 1921 the writer has looked for Pagniello's sign in 700 malaria cases and has found it in 90 per cent of them. The sign consists of exquisite tenderness in an intercostal space over the spleen, generally the ninth, less frequently in the eighth or tenth. [See this *Bulletin*, Vol. 17, p. 137.] C. L.

Hodson (V. S.). **Quinine and Malaria. A Plea for Moderate Dosage.**—*Kenya Med. Jl.* 1927. Mar. Vol. 3. No. 12. pp. 349–354.

Hodson points out that adult natives of malarial districts take malaria very slightly if at all, that a series of dry years with a failure in the " mosquito crop " followed by a wet year brings malaria, that blackwater fever is rare among natives, and that an Englishman suffering from exposure will develop an active from a latent malaria. He concludes that the resistance of the individual is the prime factor in combating malaria, and that quinine must be given so as to stimulate resistance. This, it is believed, may be attained by intermittent administration, and he details a scheme in which three or four days of quinine taken in two ten-grain doses and 3 or 4 free days follow one another for 21 to 3 months, the intervals being gradually extended at the expense of the quinine-taking days. The statement is in the nature of authority. Subjects are placed in three classes : (1) the local native with acquired protection, (2) the unprotected but healthily living European, (3) the unprotected visitor with some handicap, the worm-infested Egyptian serving as an example. C. L.

GUILLON (A.) & KÉRUZORÉ (A.). Quelques précisions sur la quinine et ses sels et leur emploi en thérapeutique coloniale. [**Employment of Quinine and its Salts in the Colonies.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Oct.–Nov.–Dec. Vol. 24. No. 4. pp. 513–531. [5 refs.]

Among much that is evidently a résumé of knowledge issued for the information of those in the French Colonial Service there are some points of general interest. In testing the disintegration of a tablet of quinine it is not sufficient merely to leave it in water. It may appear unaffected although on disturbance it may fall to pieces. The addition of weak acid in one case shortened the disintegration time to three-quarters. As a basis for tablets he tried a mixture of tartaric acid and bicarbonate of soda, but the mixture is too hygroscopic and "explosive." Hypodermic injection of quinine, mentioned as permissible in instructions issued by the Société de Pathologie exotique and forwarded to the Minister for the Colonies, is condemned Of injection methods, that into the veins is held to be the route of election. It is surprising to find that the intratracheal route has actually been employed in times past. For the subarachnoid route a case of LE DANTEC'S is quoted where 15 days' anaesthesia of the perineum and genito-urinary organs followed a dose of 2 to 6 cgm.; it requires further study.

C. L.

BRITISH MEDICAL JOURNAL. 1927. Apr. 9. p. 702.—**Resistance to Quinine in Malaria.** [Correspondence.]

Sir Humphrey ROLLESTON having, in his Presidential address to the Medical Society of London, referred to " the extremely resistant character of malaria to quinine treatment during the War in the Macedonian area," " I.M.S." (*Brit. Med. Jl.* 1927, Mar. 19th, p. 542) writing evidently with large experience from the Punjab, India, notes that cases, established by microscopic examination as having tertian or subtertian malaria, were mostly brought under rapid control by treatment with quinine sulphate. In practically all unyielding cases the urine showed no quinine. From the fact that exhibition of the hydrochloride or bi-hydrochloride invariably resulted in the appearance of quinine in the urine with fall in temperature, it is concluded that the lack of excretion under the sulphate signified lack of absorption. " R.A.M.C. Diploma in Tropical Medicine " from his own experience strongly backs " I.M.S." in his suggestion " that the so-called resistance to quinine is merely lack of absorption, as the [little soluble] sulphate has always been the chief preparation used everywhere on account of its cheapness."

C. L.

DE-VECCHI (Gino). Il chinino nelle malariche gravide. [**Quinine in Pregnant Malarial Patients.**]—*Policlinico.* Sez. Prat. 1927. Feb. 7. Vol. 34. No. 6. p. 207.

Of 400 malarial cases seen between April and November, 1926, 18 were pregnant. Fourteen were tertian infectious, two quartan, one subtertian and one abnormal. He cites one pregant woman who took quinine to the point of poisoning without terminating pregnancy and concludes that in all gravid women with malaria treatment should at once be instituted, that the drug's ecbolic action is little or none in the first months of pregnancy; and that, later, quinine should be combined with an opiate.

C. L.

GUILLEMENT & DUVAL. Quatre cas de mort consécutive au paludisme aggravé par la grossesse. **[Four Cases of Death from Malaria in Pregnancy.]**—*Ann. de Méd. et de Pharm. Colon.* 1926. July–Aug.–Sept. Vol. 24. No. 3. pp. 395–402. [1 ref.]

These four deaths are definitely attributed to pernicious accesses of malaria after delivery. In the first *P. vivax* was found, 2·5 gm. quinine was given intramuscularly in half-gramme doses and she died in convulsions. The second showed *P. falciparum* and died in hyperpyrexia after 4 gm. of quinine given intramuscularly and intravenously. In the third no plasmodia were found, 6 gm. of quinine were injected, and she died in hyperpyrexia with a large tender uterus and a purulent and stinking vaginal discharge. In the fourth *P. falciparum* was present, she had 3·5 gm. of quinine partly at least intravenously and 0·5 gm. of quinoform. She died unconscious.

C. L.

GIEMSA (G.). Ueber den Mechanismus der antimalarischen Chininwirkung. **[The Mode of Action of Quinine in Malaria.]**—*Muench. Med. Woch.* 1927. Apr. Vol. 74. No. 14. pp. 574–577. [26 refs.]

Giemsa concludes that it must be accepted that quinine acts directly on the malaria parasite, to which it is anchored and which it poisons; it is incapable of releasing specific immune body, but nevertheless is possibly favoured in action by its presence. Immune body is formed by means of the disintegrating parasites which have been killed by quinine.

[Warrington YORKE and MACFIE at the meeting of the Royal Society of Tropical Medicine and Hygiene held on 15th May, 1924 (this *Bulletin*, Vol. 22, p. 50) concluded—

> " Quinine given to a patient whose blood contains numerous malaria parasites invariably destroys directly, or more probably indirectly, large numbers, but not all, of the parasites, thus setting free a considerable quantity of soluble antigen. The antigen provokes by stimulation of the host's tissues the formation of immune-body. The immune-body, if present in sufficient amount, destroys the remaining parasites, thus resulting in sterilisation of the infection and in the cure of the patient."

This paper is not among the 26 references quoted by the writer.]

C. L.

BEIHEFTE ZUM ARCHIV FÜR SCHIFFS- UND TROPEN-HYGIENE. 1927. Vol. 31. No. 1. 145 pp. With 73 charts in text & 12 coloured figs. on 1 plate.—Ueber Plasmochinbehandlung der natürlichen Malaria. **[Plasmochin Treatment in Naturally Acquired Malaria.]**

[MÜHLENS (P.) & FISCHER (Otto), FISCHER (Otto), ROEHL (W.), SCHULEMANN (Werner) & MEMMI (Guglielmo), EICHHOLTZ (Fritz), RADOJIČIĆ (Mihajlo M.), DJOKIČ (Al.) & ŠTAMBUK (Dinko), POLYCHRONIADES (Georges), SLIWENSKY (M.)]

This book is contributed by 9 different writers. Their conclusions may be summarized. MÜHLENS writes that plasmochin is readily taken and well borne and is without the bitter taste of quinine, but that, particularly in nervous patients, it produces cyanosis and abdominal pain with sometimes methaemoglobinaemia. Intoxication symptoms have not hitherto been recorded unless the daily dose reaches 0·18 gm. [in MANSON-BAHR'S three cases reported in this number the daily dosage was 0·12 gm., 0·08 gm. and 0·12 gm.] In dose of 0·02 gm. 4 or 5 times a day, or of 0·05 gm., twice a day it is at least as effective as quinine in tertian and quartan malaria and seems to be followed less frequently by relapse. It has little effect on subtertian rings, and in this infection relapse is more frequent than after quinine. Plasmochin compound tablets are accordingly to be given in this infection (0·1 gm. plasmochin and 0·125 gm. quinine). Plasmochin is the first medicine which with certainty removes crescents from the blood within a few days and prevents their reappearance. [See, however, the report by BÄRMANN and SMITS in this number.] In several cases of quinine idiosyncrasy and of blackwater fever [which last is characterized as haemoglobinuria] plasmochin has been well borne and effective.

FISCHER deals with the prophylactic use of plasmochin and administration of plasmochin and quinine to sailors on a Hamburg-Bremen Africa Line steamer. It does not have seemed possible to control the experiments fully.

ROEHL in Spain confirms the action on tertian parasites and on crescents and its slight influence on subtertian schizonts. RADOJIČIĆ writes in the same sense, as do DJOKIĆ and ŠTAMBUK, and POLYCHRONIADES and SLIWENSKY.

SCHULEMANN and MEMMI'S contribution marks the fourth publication of their work, which is considered immediately below.

EICHHOLTZ finds that in dogs, cats and guineapigs intravenous injection of plasmochin in doses of 2 to 3 mgm. per kilogramme suppresses alternate systoles, the heart with higher doses becoming irregular. This action is lessened by adrenalin or quinine.

C. L.

MEMMI (Guglielmo) & SCHULEMANN (Werner). Sulla plasmochina, derivato sintetico della chinolina, rimedio antimalarico. **(On Plasmochin, a Synthetic Product obtained from Quinoline, as an Antimalarial Drug.)**—*Riv. di Malariologia.* 1927. Jan.–Feb. Vol. 6. No. 1. pp. 40–71. With 1 coloured plate & 20 charts. [Refs. in footnotes.] [English summary p. 191.]; also in *Policlinico.* Sez. Prat. 1927. June 20. Vol. 34. No. 25. pp. 883–885.

SCHULEMANN (Werner) & MEMMI (Guglielmo). Plasmochin, ein Synthetisches, gegen die Malariainfektion wirksames Chinolinderivat.—*Klin. Woch.* 1927. June 4. Vol. 6. No. 23. pp. 1093–1094. [1 ref.]

Under the same title these papers, together with one mentioned just above by the same writers, all deal with the same work, the first and that in the Beihefte being full accounts with protocols. The writers have treated about 120 persons with plasmochin, the dose being, for tertian and quartan malaria, 0·02 gm. in a tablet three times every day for a week and thereafter on the last three days of following weeks for five more. All stages of these parasites are affected and disintegrated by the drug. The fever disappears in one or two days and the parasites in 5 or 6, quartan being more resistant than tertian malaria. For *P. falciparum* infections plasmochin has little effect on the asexual, but a marked one on sexual forms. It does not, then, replace quinine in subtertian malaria but is a remedy against crescents. It is, however, given in considerably larger doses than for the other plasmodia namely two tablets (0·04 gm.) three times a day continued daily for a fortnight. Thereafter a two-days' pause and four days similar administration ; a repetition of this ; a three-days' pause and 4 days like dosage ; a repetition ; a four-days' pause and three days like dosage. An alternative treatment is the mixed tablet containing 0·01 gm. of plasmochin and 0·125 gm. of quinine sulphate. Splenomegaly is rapidly reduced. The statement that plasmochin is valuable in blackwater fever seems to be a pious repetition, as certainly are those which, following MÜHLENS, incorrectly attribute the cyanosis to nerve stimuli, and announce that it has never been fatal. It may induce abdominal pain. The urine never showed albuminuria [and so presumably never methaemoglobinuria.]

C. L.

BÄRMANN (G.) & SMITS (E.). Ueber Plasmochin. [**Plasmochin.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 151–158.

A tablet of plasmochin (0·02 gm.) or of plasmochin compound (plasmochin 0·01 gm. and quinine sulphate 0·125 gm.) was given four times daily for 14 days. Plasmochin was given to 11 tertian and one quartan case. Parasites disappeared in from 3 to 80 hours (average 36), the spleen diminished and the haemoglobin improved ; no relapses within 80 days. Plasmochin compound was given to 3 tertian cases. Two remained free over an observation period of 70 days ; one relapsed in 50 days. Plasmochin was given to 9 subtertian cases observed for 80 days. One remained without relapse, 1 relapsed after 60, one after 50 and three between 1 and 30 days ; that is to say, in one instance, parasites never left the blood throughout a month's treatment. Of these 9 cases, 7 were without crescents at the beginning of treatment. Of these 7, crescents appeared at the first relapse in 3, and in 1 of them at each of two more relapses which occurred after administration of plasmochin compound. It is concluded that plasmochin is useless in infection by *P. falciparum,* it does not necessarily prevent the appearance or reappearance of crescents in relapses. They have even appeared in the blood during treatment, after it had been continued for 120 hours. Plasmochin compound was given to 8 relapses. Of these 6 remained free from further relapse for 30 to 60 days ; one case relapsed twice under this treatment, with crescents during actual treatment and these as well as schizonts remained visible in the blood for 30 days in spite of 14 days' treatment with plasmochin compound—4 tablets daily. One case died.

Weight 48·4 kgm., haemoglobin 70, pulse 68, spleen 1 finger, no albumin, one subtertian ring in four fields. Treatment, plasmochin 0.02 gm. 4 times daily. On the third day he had some cyanosis, became unconscious, temperature 39·2° C. [102.55° F], leucocytes 16,000, albumin without casts. He was given quinine intravenously and intramuscularly with disappearance of parasites from the circulation, but he died next day with a rapid fall in temperature and with a crescent in the blood. No malaria parasites were found except some crescents in the spleen. The liver showed patchy, fresh, and very slight necrosis.

C. L.

MANSON-BAHR (Philip). **The Action of Plasmochin on Malaria.**—*Proc. Roy. Soc. Med.* 1927. Apr. Vol. 20. No. 6. pp. 919–925 (Sect. of Trop. Dis. & Parasit. pp. 33–39.) [5 refs.]

Manson-Bahr describes ten cases of tertian, six of subtertian and two mixed infections treated with plasmochin ; and five of tertian and five of subtertian treated with plasmochin compound. Of the tertian cases all are reported as doing well, without known relapses. Of the six subtertian cases two relapsed, one while the treatment was being carried on ; two developed methaemoglobinaemia, in one case intense; two were cured. Of the mixed cases one developed "cyanosis" with methaemoglobinuria, and the other relapsed with benign tertian malaria six months later. Those treated with the " compound " tablets did well. The rate in contraction of the spleen was most marked. Manson-Bahr characterizes the "cyanosis" as undoubtedly toxic, developing with great suddenness, first observed on the mucous membrane of the lower lip, the palate, gums and finger nails being shortly involved. The face is livid grey. There is no dyspnoea nor undue distress. Two patients complained of curious clammy sweats, abdominal pains and a bruised sensation over the lower ribs. The blood was chocolate-brown with methaemoglobin. In one case the symptoms came on after 0·4 gm. plasmochin in daily doses of 0·12 gm. Methaemoglobinuria appeared within 24 hours of the " cyanosis," with albumin and amorphous casts. " The attack resembled a mild blackwater fever which ran a favourable course." These blackwater symptoms lasted two days and were accompanied by typical haemolytic icterus, by destruction of one and a half million red corpuscles per cmm. of blood and by disappearance of malaria parasites from the blood during the attack. The " cyanosis " lasted only 24 hours. In the second case the lividity came on after 0·24 gm. (0·08 gm. daily for 3 days) and lasted for seven days. In the third it was slight but epigastric pain was considerable. The total dosage had been 0·4 gm., and the daily 0·12. In discussion Dr. HENNINGS on behalf of the manufacturers put the proper dose as 0·06 gm. daily. [MÜHLENS himself is evidently using 0·08 to 0·1 gm. daily.]

C. L.

EISELSBERG (Karl P.). Plasmochinvergiftung. [**Plasmochin Poisoning.**]—*Wien. Klin. Woch.* 1927. Apr. 21. Vol. 40. No. 16. p. 525. [3 refs.]

A medical man from America who came to Vienna for a persisting pemphigus conjunctivae (for which he had endured six operations and a year in a dark room) and had never had malaria, yellow fever or syphilis, received plasmochin apparently on chance. Between 29th November and the morning of 2nd December he had 10 pills of plasmochin, or 0·2 gm. in all. He was by that time yellow, weak, with much epigastric pain, and, after the last pill, vomited and lost consciousness. His temperature was 39·6 [103·3°] and the urine deep brown. He came under the care of Eiselsberg next day. He was still vomiting but not bringing up blood. Urine dark brown with brown sediment and giving the guaiacum test, even when diluted 500 times ; much albumin ; red corpuscles ; an occasional leucocyte ; no casts. Liver very tender ; spleen two fingers. Red corpuscles 2,400,000 with poikilocytosis and anisocytosis. By 6 p.m. the red corpuscles numbered 1,550,000 ; the serum was brownish red with a strong direct bilirubin reaction and with urobilin strongly positive.

Blood transfusion and dextrose improved matters. On 4th December the red corpuscles numbered 1,300,000, the whites 15,700; on 5th, methaemoglobin was spectroscopically established in the urine, apparently the first spectroscopic examination made. Rapid improvement followed.

It is noted that the amount of plasmochin was far under the permitted daily dose of 0·15 gm. and that there was not the slightest sign of the circulatory disturbance suggested by MÜHLENS to account for the cyanosis.

C. L.

RAYNAL (J.). Contribution à l'étude du stovarsolate de quinine dans la tierce maligne. [**Stovarsolate of Quinine in Subtertian Malaria.**] —*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 408–413. With 1 chart. [2 refs.]

A man of 21, called up for military service and sent to Syria, dropped his prophylactic quinine and developed malaria, for which he was treated by quinine in unstated doses for 12 days. His temperature had reached 41·6° C. [106·9° F.] He was invalided. On reaching Beyrouth, *Plasmodium falciparum* was found, a few schizonts and some crescents, red corpuscles 3,038,000, haemoglobin 65, large mononuclears 22 per cent. He was given four successive courses of stovarsolate of quinine by mouth each lasting ten days and comprising the taking of four 0·25 gm. tablets daily. Five days separated each course. Schizonts disappeared from the peripheral blood within 36 hours. Crescents increased per thick drop from 57 to 649 at the end of 8 days, dropping to 194 after three more and disappearing during the third course. Stovarsolate of quinine contains equal parts of quinine and stovarsol.

C. L.

FREIMAN (Mark). **Stovarsol in Treatment of Malaria.**—*Jl. Trop. Med. & Hyg.* 1927. May 16. Vol. 30. No. 10. pp. 127–128. [6 refs.]

Stovarsol was given in adult doses of 16 grains (four tablets) to 68 cases of infection with *P. vivax*, 20 of *P. malariae* and 5 of *P. falciparum.* In accordance with the experience of others it had no effect upon either of the last two forms. It must be held to have cured the others. In acute cases it was given in full dose until the blood became negative (two to six days) and thereafter uninterruptedly for 21 days; in chronic cases in courses, up to three, of 21 days with 10 days' intervals between courses. Cases were not held cured unless the haemoglobin and blood cells had returned to normal and there had been no attack for three months.

C. L.

TARDRES (J.). Le stovarsol dans le paludisme. [**Stovarsol in Malaria.**] —*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 49–52.

Reminding readers that stovarsol is inefficient in infection with *P. malariae* and *P. falciparum* and that even in those with *P. vivax* it does not cause splenic shrinkage as does quinine, Tardres describes two cases of the last infection, mother and child, treated with stovarsol, the courses lasting 73 and 83 days respectively. The mother relapsed 7 days after cessation of treatment, and the daughter 14.

C. L.

GABARROU (Felix G.). Acción del Stovarsol por vía digestiva sobre el *Plasmodium vivax.* [**The Action of Stovarsol by Mouth on** *Plasmodium vivax.*]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 363–367. [11 refs.]

Thirty-six cases of tertian malaria were treated by stovarsol, 1 gm. daily to adults to a total of 9 gm., 0·5 gm. to children. No ill effects followed; within 8 hours the gametocytes and large schizonts were affected, and within 24 hours parasites had disappeared. Relapse occurred within 35 days. The rapid prophylactic effect, by action on the gametocytes, is particularly mentioned. The drug had no effect on the subtertian or quartan parasites.

C. L.

GUÉRIN (F.), BOREL (E.) & ADVIER (M.). Stovarsol et paludisme. [**Stovarsol and Malaria.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 331–337. [3 refs.]

The writers report the effects of stovarsol treatment in ten cases of *P. vivax*, five of *P. fqlciparum*, three of *P. malariae* and one of a mixture of *P. vivax* and *P. falciparum.* As in the experience of others, the drug was ineffective in ridding the blood of plasmodia except *P. vivax.* With the last, disappearance was rapid but relapse within two months was the rule. It is judged that relapse and not reinfection was concerned, seeing that the predominant local infection was with *P. falciparum*, and that in all the reappearing attacks *P. vivax* alone was concerned. On the other hand the writers make what appears to be a new observation, that against *P. malariae* and *P. falciparum* stovarsol forms a remarkable adjuvant to quinine. They note also a point, first observed by SINTON, that about 18 hours after administration there is a sharp rise in temperature attributed by him to massive destruction of the grown parasites. They agree; since this rise does not occur in non-malaria cases nor in infections with *P. falciparum* or *P. malariae.*

C. L.

DE MELLO (Froilano) & VERNENCAR (H. M. P.). Effets du traitement par la *Smalarina Cremonese* sur six malades atteints de malaria chronique avec récidives fébriles (lre communication.)—[**Treatment by Smalarina of Six Cases of Chronic Malaria.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 323–330.

The authors describe six cases of treatment with smalarina, as far as possible the full treatment of 120 tablets over 30 days. The drug sometimes produced nausea and vertigo or even vomiting and headache. In no case did parasites disappear from the blood. In every case quinine and arsenic were needed. The drug was demonstrated as valueless whether as a parasiticide, or, so far as blood examination and the general state showed, as a means of increasing the patient's resistance.

C. L.

PERONI (Giacomo). Relazione finale su esperienze di immunizzazione preventiva e curative della malaria col metodo del Prof. Guido Cremonese. [**Final Report upon the Cremonese Method in preventing and curing Malaria.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Apr. Vol. 8, No. 4. pp. 206–208. With 1 folding plate.

Smalarina was administered for a whole year, from 1st December, 1925, to 30th November, 1926, according to CREMONESE's formula to 39 chronic malarias who were sceptical but were finally inspired by a personal example in high quarters. Not one of the 39 lost a single day's work during 1926 [the periods do not correspond] although, they said, they had lost 1,009 days from malaria during the previous year. However 36 chronic malarias not taking smalarina admitted to losing 73 days work during 1926 and 1642 days during 1925 [in no case is a blood examination mentioned, nor are any details given as to methods of selection, control, or reward of those concerned.]

C. L.

TESIO (Fausto). Il valore terapeutico e profilattico della cura Mercurio-Antimoniale della malaria. [**The Therapeutic and Prophylactic Value of the Mercury-Antimony Cure in Malaria.**]—*Malariologia.* Naples. 1927. Apr. 15. Ser. 3. No. 1. pp. 12–16.

The Director of the Italian Hospital at Salt in Transjordania, contrary to the experience apparently of all others who have reported independently on smalarina, writes regarding a village of 450 inhabitants. Of these, 237 appear to have been treated with smalarina from September, 1924 to March, 1925. The number who reported six to twelve months after treatment was 206. Of these 3 were unaffected, 14 relapsed and 189 were cured. [See also this *Bulletin*, Vol. 22, p. 819 and Vol. 23, pp. 144 and 823.]

C. L.

FRONVILLE (G.); DUPUY. Quelques observations sur l'action de la peracrina dans la malaria. [**Action of Peracrina in Malaria.**]—*Bull. Méd. du Katanga.* 1926. Dec. Vol. 3. No. 4–5. pp. 151–153.

Fronville describes three cases treated with peracrina in the European Hospital, Elizabethville. In one patient malaria parasites were never found, but she was held to be suffering from chronic malaria. She had six tablets daily for a month and refused more on account of the gastric disturbance induced. In the second, who showed crescents, a peracrina followed a quinine course, but had to be abandoned on account of gastric trouble, though a second course [perhaps after a second course of quinine] was well borne [she was in hospital, so presumably took the tablets] and after 6 injections of neosalvarsan she left hospital in splendid health. In the third, after a four days' course in a man with "numerous malaria parasites," quinine had to be given. He had apparently taken a month's course of 6 tablets of peracrina daily before this. Dr. Dupuy curtly notes regarding the negro hospital in Elizabethville that his efforts to use the drug were all interrupted by colic and diarrhoea. [See this *Bulletin*, Vol. 23. p. 144, 823.]

C. L.

FISCHER (Otto). Experiencias en la malaria con paludismol. [**Trial of Paludismol in Malaria.**]—*Semana Méd.* 1927. Jan. 27. Vol. 34. No. 4 (1724). pp. 250–253. With 5 charts in text.

Paludismol is a yellow liquid, of disagreeable smell and a taste both acid and sweet. It is described as containing extracts of *Senecio salignus, Loeseliüa coccinea* and *Calliandra grandiflora.* It was sent from the Argentine by request of MÜHLENS and tested by Fischer on seven cases of tertian and two cases of subtertian malaria. No therapeutic action could be attributed to it in the treatment of malaria.

C. L.

REITLER (Rudolf). Ueber die Cadmiumbehandlung der Malaria. [**The Cadmium Treatment of Malaria.**]—*Wien. Klin. Woch.* 1927. Mar. 10. Vol. 40. No. 10. pp. 314–317. [8 refs.]

Cadmium was used in one of three forms. A 1 per cent. watery solution of cadmium sodium tartrate for intravenous injection in dosage of 2·5 cc. described as efficient but toxic ; 719d v Heyden of unknown composition, given intramuscularly in doses of 0·5 to 1 cc. on 3 consecutive days and proving valueless in five cases; and cadmiol, a suspension in oil of cadmium subsalicylate with a 5 per cent. cadmium content, 1 cc. given intramuscularly every third day. It produces pain for some three days and was apparently used in all the 20 cases described. Of these ten were tertian. Two remained free from parasites during observation periods of 3 to 7 weeks ; in 5 parasites returned in 12 days, 1 month, 1 month, 7 weeks, 6 days ; in three they never disappeared and in one fever returned without parasites. In three quartan cases parasites either did not disappear for 5 weeks or, after a primary disappearance, reappeared in a few days. In five subtertian cases, two showed no parasites over observation periods of one and six weeks, one relapsed in the fourth week and in two parasites persisted throughout. All the cases were hospitalized [which perhaps suffices to explain all the reported improvement.] The effects of continuing quinine with cadmium are also reported.

C. L.

WALDORP (Carlos P.). El sulfato de berberina utilizado como medio diagnóstico y terapéutico en el paludismo latente. [**Sulphate of Berberine as Diagnostic and Therapeutic Means in Latent Malaria.**] —*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 355–359. With 3 charts. [1 ref.]

The writer strongly advocates berberine as a provocative in the diagnosis of latent malaria. Its specific action in reducing splenomegaly is held to give it a great advantage when associated with the drugs ordinarily used in the treatment of malaria. One illustrative case is given.

A man with a history of quartan malaria was given 1 gramme of quinine daily for 3 days, 0·75 gm. for 3 days and thereafter 0·25 daily till discharge (date unstated). Readmitted shortly for recurrence he had ten intramuscular injections of quinine (quantity unstated) and four tablets daily of of treparsol. Discharged, he again shortly returned to hospital and received two 0·3 gm. injections of neosalvarsan. These induced vomiting and hyperpyrexia and resulted in his discharge as an incurable malaria. Coming under the observation of the writer no parasites nor fever were detected until he had for a week taken a daily dose of sulphate of berberine. Then, first simple and afterwards double quartan infection was clinically and microscopically established. The first injection of quinidine caused the disappearance of parasites and fever. Presumably it was continued. At least the spleen contracted and there was no recurrence during two months' observation.

C. L.

FISCHER (Otto). Ueber einige angebliche Malariamittel. [**Some Alleged Malarial Remedies.**]—*Muench. Med. Woch.* 1927. Mar. 25. Vol. 74. No. 12. pp. 483–488. With 11 charts in text. [14 refs.]

Certain therapeutic tests were made with the following drugs— "Chininphytin" the quinine salt of inosithexaphosphoric acid containing 58 per cent. of quinine base, cinchonine, bismuth, antimony, Albert 102, peracrina 303, elevosan and paludismol (see p. ). It is concluded that cinchonine, Albert 102 and peracrina 303 have an antimalarial effect less powerful than that of quinine and do not form practical substitutes, that paludismol and elevosan are useless, and that only one is as valuable as "quinine" namely "Chininphytin," which, however, is after all a quinine salt. Antimony had no evident influence on crescents.

C. L.

HEYMANN (P.). Du traitement des rates paludéennes par la radiothérapie. [**Treatment of Malarial Spleens by Radiotherapy.**]—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo,* 1925. Vol. 1. pp. 867–889. [7 refs.]; also in *Jl. de Radiol. et d'Electrol.* 1926. Nov. Vol. 10. No. 11. pp. 481–492. [7 refs.]

Sixteen cases of X-ray therapy are described in detail. The rays, used over the spleen, cause nearly always a leucopenia with a relative decrease in the large mononuclear leucocytes and an increase in eosinophils. In chronic cases the effect on splenomegaly is inappreciable. In acute cases, which have improved, heavy dosage is dangerous, and it is held that, taking into consideration the length of treatment and its difficulties and inconveniences, it should be rejected in favour of that by quinine and arsenic.

C. L.

i. KINGSBURY (A. Neave). **Some Investigations of Malarial Fevers. IV.—The Complement Fixation Reaction.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 359–364. [4 refs.]

ii. MANSON-BAHR (Philip). **Researches upon the Production of Malaria Antigen for a Complement-Deviation Test.**—*Ibid.* July. Vol. 21. No. 1. pp. 63–67. [9 refs.]

i. None of the complement fixation tests employed for such chronic affections as tuberculosis, hydatid disease and schistosomiasis have proved comparable with the Wassermann reaction, but, by reducing the dose of complement to a minimum and by employing a suitable antigen, some success has been obtained. In such conditions the efficacy of the test centres round the discovery of a sensitive and highly specific antigen of low anti-complementary power. Eleven antigens were tested, eight from the spleen, liver, heart, brain and blood of a subtertian infected patient who died comatose after a single quinine injection, and three from the blood of one, $\frac{1}{16}$ of whose corpuscles were infected with *P. vivax.* The most satisfactory antigens were saline emulsions of washed and lysed blood. The results these gave were as follows. Of subtertian malarias, 25 were tested with *P. falciparum* antigen and 48 per cent. were positive (graded as 1 to 4); while 16 were tested with *P. vivax* antigen with 31 per cent. positive. Again, of tertian malarias, 12 were tested with *P. falciparum* antigen with 50 per cent. positive, and six with *P. vivax* antigen with 67 per cent. positive.

ii. Since FAIRLEY, in 1919, had shown that, in schistosomiasis, a specific antigen could be obtained from the larval stage of the parasite in the intermediate host, Manson-Bahr began, in 1920, an attempt to obtain a specific antigen from the oöcysts of plasmodia contained in the stomachs of *Anopheles maculipennis.* The paper describes how by the aid of JAMES and GILL, he obtained with great difficulty an antigenic extract from the stomachs of 26 anopheles. He next attempted to obtain the oöcysts of the bird malaria parasite in *Culex fatigans* working partly upon two infected canaries forwarded by Ed. SERGENT from Algiers, partly upon a shipment of 100 Bombay sparrows. In both cases the birds which reached London were but little infective to Culex, and only 24 infected stomachs were obtained. Using this combined material, no evidence of fixation of complement was obtained. It is believed that success can be attained, but only if antigen is sufficiently strong—at least 100 stomachs to 1 cc. of absolute alcohol; and it is suggested that the experiments should be repeated in a country where both anopheles and malaria abound.

C. L.

REATEGUI (Jorge V.). La hiperalbuminosis del liquido céfalo-raquideo en el paludismo. **[Excess of Albumin in the Cerebrospinal Fluid in Malaria.]**—*Crónica Méd.* Lima. 1926. Nov. Vol. 43. No. 761. pp. 314–321; 1927. Jan. & Feb. Vol. 44. Nos. 763 & 764. pp. 18–25; 54–61. [5 refs.]

In view of varying statements, the author's first task was to determine the normal albumin content in cerebrospinal fluid. Ten cases were examined and the content varied between 12 and 25 parts per 100,000. He accordingly took 30 parts per 100,000 as the normal maximum. He proceeded to examine this point in 30 malarial cases, microscopically established and comprising all three species, and found that the content lay between 80 and 100 parts per 100,000 in hyperacute cases, between 75 and 90 in acute, and between 60 and 70 in more ordinary cases. The administration of quinine had no appreciable effect on this, and its relation to acuteness of symptoms seemed to suggest a meningitis. It was not possible to determine how soon this albumin excess appeared nor how long it lasted. Globulin was in small quantity only. No relation was detected between the amount of albumin and of cellular elements. As judged by its rate of expulsion, the pressure of the cerebrospinal fluid was raised.

C. L.

MAYR (Julius K.). Die Wassermannsche Reaktion bei der Malaria. [**The Wassermann Reaction in Malaria.**]—*Med. Klin.* 1927. Jan. 21. Vol. 23. No. 3 (1154). pp. 94–95. [10 refs.]

After citing some of the literature, there are considered 80 cases of injected malaria. In 20 per cent. of these the Wassermann reaction, which a previous course of salvarsan had rendered negative, became positive during the malaria and disappeared later. It is concluded that if parasites are not found and the patient is free from fever a positive reaction signifies syphilis.

C. L.

YAMANAKA (S.). Einige klinische Untersuchungen ueber die Malaria. I. Mitteilung. [**Clinical Investigations in Malaria. Part I.**]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. Sept. No. 258. German summary pp. 3–4. [In Japanese.]

The German summary states that the excretion of total nitrogen increases during fever. The excretion of urea runs parallel with it. Nitrogen as ammonia is commonly increased during fever and falls for some days after. Ehrlich's test gives urobilinogen in 90 per cent. of malaria cases, the reaction being unquestioned in 70 per cent., and lasting for some days. Urea and the residual nitrogen are generally increased in the blood in malaria, but not so ammonia except in coma. Bilirubin is generally increased in the serum ; van den Bergh's reaction was delayed, except in one case where it was immediate.

C. L.

BARDUCCI (Aldo Vincenzo). Lo sviluppo dei gameti di individui chininizzati nella zanzara trasmettitrice. (**The Development of Gametocytes in Mosquito Vectors infected from Quininized Patients.**)—*Riv. di Malariologia.* 1926. Sept.–Dec. Vol. 5. No. 5–6. pp. 594–612. [14 refs.] [English summary p. 738.]

The writer has fed specimens of *Anopheles claviger* on one case of subtertian, one of quartan and one of tertian malaria who had had quinine at greater or less intervals, and on three cases of tertian malaria who had had no quinine. Development of the sexual stages took place readily in the latter and either not at all or unsatisfactorily in mosquitoes fed on those who had had quinine. It is considered unquestionable that the failure to develop was due to the quinine.

C. L.

TURCU (Titus). Die zeitliche Verteilung und das Mengenverhältnis der Makrogameten und Mikrogametozyten bei menschlicher und Vogel-Malariainfektion. [**Appearance and Relative Numbers of Macrogametes and Microgametocytes in Human and Avian Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. pp. 212–232. With 8 charts. [24 refs.]

The writer finds in 30 cases of treated human malaria that female gametocytes were more numerous and more variable than male, which were never seen alone, although female forms were so seen at the beginning of the period during which sexual forms were present ; and at the end if there had been treatment, though both sexes were present equally if there had been none. Indeed sometimes males predominated in either circumstance. Under provocatives, such as adrenalin and spleen douching, gametocytes appeared in 48 hours in tertian and after ten days in subtertian malaria, the former showing a tertian and the latter an irregular rhythm. Both sexes were present. In bird malaria the sexual forms ran parallel with the degree of illness; females being usually in excess, but males being more numerous in heavy infections.

C. L.

BIANCHI (Andrés E.). Notas sobre hematologia del paludismo. [**The Blood in Malaria.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 422–455.

The leucocytic formula used is very complex. Neutrophil polymorphonuclears are classified in three categories, lymphocytes in three and monocytes in two. Pathological lymphocytes are described in 65 of the 85 cases examined and in numbers varying from 1 to 18 per cent. In the instance last quoted they were subdivided into neutrophil metamyelocytes, monocytic haemoplastic cells, endothelial cells, Turk's cells, while other subdivisions are neutrophil myelocytes, polychromatophil erythroblasts, Rieder's cells, eosinophil metamyelocytes and lytic polymorphonuclears.

C. L.

GRIGORIEVA (S. P.). [**Costa's Novocaine—Formalin Reaction in Malaria.**] —*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 3. pp. 140–141. [In Russian.]

Costa's reaction was tested in 150 cases of benign tertian fever. The method is applied as follows: to 1·5 cc. of 2 per cent. solution of novocaine in saline are added 3 drops of 5 per cent. sodium citrate and 3 drops of the blood to be tested. The mixture is centrifuged, and 1 drop of pure formalin is added to it. A positive reaction is manifested by the appearance—not later than 15 minutes after the addition of the formalin—of turbidity in the lower half of the test-tube. Positive results were obtained in all the 150 cases examined at different stages of the disease and treatment. The reaction was most marked in acute and chronic cases, but gradually diminished during the course of treatment. It persisted, however, to a certain degree even after treatment was discontinued and the parasites had disappeared from the circulation. [Control experiments were apparently not conducted.]

C. A. Hoare.

PEREKROPOFF (G. J.). Zur Frage der atypischen Entwicklung der Parasiten der tropischen Malaria. [**Atypical Development of Parasites of Subtertian Malaria.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. June 8. Vol. 102. No. 8. pp. 432–449. With 101 figs. on 3 plates. [21 refs.]

The writer returns to the question of aberrant forms of plasmodia (*ante*, p. 276)—this time to those of the subtertian parasite. Three plates display 101 such forms, which are divided into five groups. They were derived from three patients, largely apparently from one who was treated intravenously, 0·04 gm. for a dose, with cyodin or cyadin (or both if they are different) which treatment did not lessen the number of parasites but somewhat diminished, it is claimed, the alkalinity of the blood. From these preparations, it is claimed, there have been demonstrated in the blood of man not merely schizonts but also sporogony—zygocysts and oöcysts. The reviewer has identified, but only from the legend accompanying the plates, the figures which are considered to represent these forms.

C. L.

FRANCHINI (Giuseppe). E il maiale ricettivo all' infezione malarica? (Osservazioni sperimentali.) [**Is the Pig Susceptible to Malaria?**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Jan. Vol. 8. No. 1. pp. 7–11.

Nine young pigs were intramuscularly injected with *P. vivax* blood and four 6 times similarly injected with blood containing *P. falciparum*. Subsequent blood examinations of the injected pigs were not infrequent. On one occasion only were any parasites found. Nineteen days after injection with *P. vivax* two gametes were identified in a thick drop, though none were found in four further examinations.

C. L.

STEEL (John P.) & NICOLE (J. Ernest). **Malarial Therapy in General Paralysis of the Insane. A Review of Three Years' Work.**—*Lancet.* 1927. Mar. 5. pp. 484–486.

From the mental standpoint the malarial treatment of general paralysis has fully justified itself at Winwick. Since it was instituted over 3 years ago 28 persons have not received it: all are dead. In thirteen it could not be induced: all are dead. Of 120 in whom infection occurred ten are recent; of the others, twenty-six have been discharged, and five readmitted. Some at least of the other discharges are in good mental health. Moreover those who have not shown such marked mental recovery or remission almost invariably become clean, in itself a sufficient warrant for the treatment. It is no longer held that the more numerous the rigors obtainable the better the prognosis. Seven or eight rigors are held usually sufficient; many have less, the average number at Winwick having been seven. From the malarial standpoint, the average incubation period, whether in natural or injected cases, has been about 12 days. In natural infections parasites are usually found in the blood two or three days before pyrexia; in unnatural infections pyrexia precedes demonstrable parasites. Concomitant with the incubation anaemia and, prior to the first rigor, small rises in temperature seldom reaching 100° F. may yet indicate the febrile type of the oncoming paroxysms. Second attacks of induced malaria have often been very difficult to establish, particularly by inoculation; this immunity appears to be biochemical; moreover spontaneous remission is in them almost the rule, pyrexia disappearing before the parasites, so much so that " when a patient shows a spontaneous remission in what is regarded as the primary attack, it is enough to make one almost certain that he has previously had malaria." Second infections are less trying than primary ones except in those who in the intervening period have become excessively fat. In such they are absolutely contra-indicated. Of thirty cases reinfected because first attacks were therapeutically disappointing, three have been discharged, 4 are doing really well and 5 show improvement.

C. L.

NICOL (W. D.). **The Care and Management of Induced Malaria.**—*Jl. Mental Sci.* 1927. Apr. Vol. 73. No. 301. pp. 209–217. With 3 charts in text.

This report deals with 310 cases treated by mosquito-induced malaria at Horton, or produced by mosquitoes infected at Horton. The report to some extent, then, overlaps that of JAMES [this *Bulletin*, Vol. 23, p. 804]. The fatality rate during or immediately following the malaria course has been 6 per cent. Infection is induced in bed [probably in the dusk present under bedclothes] by four or five infected mosquitoes in a small glass jar whose mouth is closed with mosquito netting, the mouth of the jar being placed against the thigh and the anopheles biting through it. The incubation period is usually 12 (10 to 24) days and patients are kept in bed during it, for (1) warmth favours development of plasmodia, (2) rest tends to eliminate the odd rises in temperature to which general paralytics are prone, (3) accidents must be prevented since quinine during the incubation period does not prevent the access. The attack is divided into three stages. (*a*) Initial with subcontinuous or irregularly remittent fever during which parasites are rarely found even in thick drop until the second or third day. (*b*) The developed stage with nearly always a *daily* attack of fever. Parasites become numerous but " it is seldom easy to correlate the course of the temperature with the stages of growth of the parasites." Great care is exercised in this stage, the temperature being taken every fifteen minutes and a blood examination made every day. By cold sponging the temperature is kept below 105° F. [40·5° C.]. Quinine is given if more than 25 parasites are found in 25 fields of a thin smear using $\frac{1}{12}$ in. oil immersion and No. 2 eye-piece, or if clinical symptoms (persistent vomiting, faintness or collapse, cyanosis, seizures, undue restlessness, albuminuria, or the slightest suggestion of jaundice) indicate. In these circumstances, and if the full number of paroxyms desired for relief of the mental condition have not been reached, one dose of 5 gr. [0·3 gm.] of quinine is administered. The usual result is cessation of fever for ten to twenty days, and although parasites persist in scanty numbers the interval allows of recuperation or probably of some development of resistance, since the fever, on reappearance, is usually tertian in rhythm and less severe in character. (*c*) The terminal stage is characterized by a tertian replacing a quotidian rhythm, the individual attacks becoming milder, and sometimes failing to recur. The antimalarial treatment has been (1) 10 gr. three times a day for five days, or (2) 5 gr. three times a day for ten days, the quinine being given in solution by mouth. Plasmochin, harmine, harmaline and toxotropin all proved less effective than quinine. About 50 per cent. of cases relapsed, but were readily cured by 5 gr. of quinine three times a day for two or three days.

" From the limited number of results collected at Horton, it appears that the percentage of ' cures ' of general paralysis in cases inoculated by mosquito-bites is considerably higher than the percentage in cases infected by direct blood inoculation." C. L.

FREEMAN (Walter). **Malaria Treatment of General Paralysis: Histopathologic Observations in Fifteen Cases.**—*Jl. Amer. Med. Assoc.* 1927. Apr. 2. Vol. 88. No. 14. pp. 1064–1068. With 8 text figs. [3 refs.]

In fifteen cases of death in general paralytics, the brains were examined. Eight died within a few weeks of the first chill. In them the usual general paralytic process seemed exaggerated, the blood vessels being surrounded densely by infiltrating cells. This exudate becomes organized, with progressive reduction and then disappearance of the cells, the neuroglia reverting to its normal protoplasmic type. The cortex resumes nearly normal lamination and thickness. It is accordingly suggested that the term "remission" will in time be replaced by "recovery" of mental health. Of the seven other patients, one seemed naturally resistant—did not react adequately; another, after 14 rigors, showed no clinical or serological improvement and died 3 years later. In neither was there any arrest in the general paralytic process. This was, however, arrested in one dying four months after malaria. The other four, living 10, 17, 18 and 19 months after malaria, showed complete disappearance of inflammatory and degenerative lesions and considerable cortical repair.

C. L.

WÜRZ (P.). Ueber die Fieberbehandlung der progressiven Paralyse. [**Malarial Treatment of General Paralysis.**]—*Schweiz. Med. Woch.* 1927. Mar. 5. Vol. 57. No. 10. pp. 217–218. [4 refs.]

The strain of tertian malaria used in Basle in 25 cases was a mild one, the temperature reaching indeed 42° C., but spontaneous clinical cure after three to ten attacks resulting in 50 per cent. of cases although parasites persisted. Quinine was always given and, in the single case held to be resistant, arsenic as well. In two cases severe attacks ensued. Gametes existed. Infection was by injection. In six cases a second infection was attempted after four or more months. All failed even with provocative measures; and when for the nervous condition more febrile attacks were required, the effect was produced by African relapsing fever.

C. L.

CLAUDE (Henri), TARGOWLA (René) & CÉNAC (Michel). Le traitement de la paralysie générale par le paludisme expérimental. [**Treatment of G.P. by Malaria.**]—*Ann. de Méd.* 1927. Mar. Vol. 21. No. 3. pp. 169–200. With 13 text figs. [19 refs.]

Malarial infection was by hypodermic injection of three to five cc. of blood, the original strain being one which had done good service in Vienna, Brussels and Holland. Three of the 143 persons were refractory to infection. Quinine in doses of 1 to 1·5 gm. for some days stopped infection, only two or three cases relapsing. It was reinforced by arsenic. A second infection was as readily produced as had been the first. Rupture of the spleen did not occur.

C. L.

RUDOLF (G. de M.) & MARSH (R. G. B.). **Some Observations upon Carbohydrate Metabolism in Malaria. With Special Reference to the Effect of Insulin and Glucose upon Benign Tertian Malaria.**—*Jl. Trop. Med. & Hyg.* 1927. Mar. 1. Vol. 30. No. 5. pp. 57–63. With 13 charts in text. [12 refs.]

These observations were carried out on paralytics or dementia praecox cases under treatment with artificially inoculated malaria. When the blood was examined once, 15·4 per cent. disclosed glucose to

Benedict's test, whereas in 112 consecutive paralytics the percentage was 0·9. If, however, repeated examinations be made, sugar is almost constantly found after malaria. For example 8 of 9 showed sugar at one time or another, the number of examinations varying from 8 to 67 and the period after cessation of malaria from 1 to 122 days. The negative case was examined more than two hours after food eleven times between the thirty-fourth and 48 days. During malaria therapy the blood-sugar, estimated by Maclean's method, varied roughly speaking inversely with the temperature. The administration of glucose during the malarial paroxysm produced no obvious objective change or effect upon the parasites, but apparently brought subjective relief. Insulin administered during malarial therapy could not definitely be said to affect the numbers of parasites, but in 60 per cent. of instances the fever terminated, not apparently as the result of the lowering of blood sugar, and when relapse occurred it was mild with low pyrexia, suggesting a partial immunization. It is held inadvisable to give insulin if the temperature is likely to rise shortly after.

C. L.

St. John (J. H.). **Observations on the Use of** *Plasmodium vivax* **in the Treatment of Cerebrospinal Syphilis.**—*Amer. Jl. Syph.* 1927. Jan. Vol. 11. No. 1. pp. 14–22. With 3 charts in text. [1 ref.]

Twenty malarial infections are noted. Eighteen patients were injected subcutaneously, all successfully although in one no febrile attack supervened, with incubation periods varying from 7 to 20 days, parasites being very few in the donor's blood in the man who went to 20 days without clinical symptoms; one was injected intravenously; and one by *A. punctipennis* collected as larvae in Washington. Injections consisted of 4 cc. of infected blood. Fever showed the usual types and variations. Clinical interpretation was relied upon in determining whether the paroxysms should be stopped before or after the usual ten. In treatment, 7 cases received 2 gm. of quinine daily for three days; one relapsed in an observation period of 5 to 12 months. In 2 cases 2 gm. in one day caused disappearance of parasites. One relapsed within two weeks. Neoarsphenamine (neosalvarsan) 0·45 gm. in a single injection caused microscopical cure over an observation period of six months. In all, 5 cases were treated with this drug with two relapses. Intravenous mercurochrome had no effect on the parasites. Gametocytes were not suppressed in six months in the strains used.

C. L.

St. John (J. H.). **The Early Appearance of Gametocytes in artificially induced Tertian Malaria.**—*Jl. Amer. Med. Assoc.* 1927. May 14. Vol. 88. No. 20. p. 1561. [1 ref.]

In six cases of directly inoculated malaria, gametocytes were observed 5, 2, 2, 2, 3 and 2 days after the onset of symptoms, in four cases in numbers sufficient to be infective to mosquitoes.

C. L.

BUNKER, Jr. (Henry A.) **Serial Hourly Leucocyte Counts in Tertian Malaria. As observed in Malaria-treated General Paralytics.**—*Amer. Jl. Med. Sciences.* 1926. Nov. Vol. 172. No. 5. pp. 681–690. [33 refs.]

The parenteral introduction of protein causes a leucopenia, not infrequently succeeded by a leucocytosis. Tertian malaria cases had leucocytic counts made at hourly intervals. In 30 of 33 instances, there was a leucopenia beginning about the time of the rigor, the leucocytes reaching a minimum during the latter part, or at the apex of, the fever curve. A leucocytosis then set in, the white corpuscles reaching their maximum about two to four hours after the minimum, that is near the summit of the temperature curve or, more usually, during its gradual descent. The phenomenon is accordingly associated by the writer with "natural" protein intravenous injection in relatively massive dosage.

C. L.

TOMMASO (Lucherini). Ulteriori osservazioni intorno e all'influenza esercitata dalla malarizzazione artificiale sul quadro ematologico e clinico delle leucemie. [**Malaria Inoculation in Leucaemia.**]—*Policlinico.* Sez. Med. 1927. Feb. 1. Vol. 34. No. 2. pp. 60–88. With 4 charts in text. [27 refs.]

Tommaso describes four cases of leucaemia injected with blood containing *P. vivax*, and also treated with X-rays and with arsenicals. The conclusion reached is that in acute or subacute leucaemia, in which condition X-rays are valueless, injection of malaria should be tried. In chronic cases the violent malarial reaction renders preferable the use of other lines of treatment such as X-rays.

C. L.

WENDLBERGER (Julius). Blutgruppen und Impfmalaria. [**Blood Groups and Inoculation Malaria.**]—*Wien. Klin. Woch.* 1927. Mar. 17. Vol. 40. No. 11. pp. 345–346.

The writer injected, intravenously by choice, tertian malaria. In the relatively few cases investigated he is disposed to believe that a cause of failure to produce infection may lie in the different blood groups involved. Thus Group IV. seems to be one from which infection is readily conveyed to groups II, III, or IV, whereas, with the other groups he is disposed to conclude that infection is easier to produce when the donor and recipient of both belong to Group II or Group III. He notes that the matter merits further consideration, and indeed it may possibly open up wider interconnexions than are here suggested.

C. L.

PILCZ (Alexander). Zur Frage der Blutgruppen und Impfmalaria. [**Blood Groups and Inoculation Malaria.**]—*Wien. Klin. Woch.* 1927. May 19. Vol 40. No. 20. pp. 653–654. [1 ref.]

WENDLBERGER'S work was repeated. Malarial infections in persons of blood group III passed on infection by injection to persons in groups I and II, and to groups III and IV. Group II infected groups II and III, group II and IV, and again, group II and IV, although the infection died out in the man in group IV. These results do not appear to favour the suggestion that the blood groups of donor and recipient are effective in determining whether infection shall appear or not.

C. L.

McKenzie (A.). **An Examination of the Question of Quinine Prophylaxis.**—*Kenya Med. Jl.* 1927. Jan. Vol. 3. No. 10. pp. 274–281. [11 refs.]

In this valuable and thoughtful compilation McKenzie brings out the following points:—The prophylactic action of quinine is non-existent; that is to say, given "prophylactically" it cures or keeps in control such infection as occurs, but does not prevent it. Its action is curative. It is ineffective against sporozoits, and merozoits must be present in numbers if the drug is to act efficiently. That action is indirect, through some mechanism in the host. Primary attacks are readily cured if there have not been previous quininization, which, if long continued, probably exhausts the body's capacity for dealing with the parasite, perhaps by lessening its reaction to quinine. He believes that, with adequate medical attention and proper nutrition, the taking of prophylactic quinine diverts attention from true prophylaxis against the vector, and by its usually unsatisfactory administration might possibly cause much malarial cachexia. In the discussion, the experience was emphasized that a regular quinine taker might, and did, get malaria but that the attack was nearly always mild, although McKenzie, in reply, did not believe that the mildness of attack attributed to the taking of 5 grains of quinine daily was borne out by experiment.

C. L.

Murat (E.). Quininisation préventive des agents du réseau algérien des chemins de fer Paris-Lyon-Méditerranée pendant deux années consécutives. **[Preventive Quininization of the Staff of the P.L.M. in Algeria.]**—*Arch. Inst. Pasteur d'Algérie.* 1926. Sept. Vol. 4. No. 3. pp. 474–481. With 1 text fig.

In 1923 the employees of the Algerian portion of the P.L.M. suffered from malaria to the extent of 23·9 per cent. After the institution of a regular issue of prophylactic quinine in tablets, 0·4 gm. of the hydrochloride to be taken daily from 1st May to 30th October, the incidence fell to 15·8 per cent. in 1924 and 7·8 per cent. in 1925. [It seems necessary, however, to issue a warning against accepting this improvement as necessarily the result of the quinine. At the same time, there were issued clear instructions as to the ill effects of stagnant water, the need of mosquito nets, and the wisdom of destruction of anopheles in houses, and a questionary as to the use which had been made of these instructions. Unless the employees neglected them with the knowledge that such disobedience was unlikely to remain unknown, there was more than one factor concerned in the reported diminution of malaria.]

C. L.

Fowler (C. E. P.). **Malaria in Palestine. A Summary of Anti-Malarial Work carried out with the 54th Division in the Mulebbis Area, April to June, 1918.**—*Jl. Roy. Army Med. Corps.* 1926. Apr. Vol. 46. No. 4. pp. 241–248.

Fowler gives an idea of the immense amount of river bank training and of jungle cutting which was entailed by the military decision that it was necessary to retain, in 1918, a position on the rivers Auja and Lejja, lying to the north of Jaffa. These river banks were rectified, as was the Abu Zeitun marsh, and wells and cisterns; and lectures, nets and repellents were employed. The writer asks, Can the infection of two thousand men, in spite of all this, be looked upon as a failure or a success? His answer is that, unquestionably, had the work not been undertaken the force would have melted away, and the justification for his belief is the condition of the remnant of the Turkish army who were found in this region.

"Not only may the measures be looked upon as having been successful, but they stand as a triumph of preventive medicine, and as a lasting example of what can be done in the fight against the worst malarial conditions. The opportunity for such an experiment is never likely to occur again, as no civil community in its senses could ever entertain such a project or countenance such a vast expenditure of money and labour for no financial return."

C. L.

FRANCHINI (Giuseppe). Su di un Plasmodio pigmentato di una scimmia. [**A Pigmented Plasmodium from a Monkey.**]—*Arch. Ital. Med. Sci. Colon.* Tripoli. 1927. Apr. Vol. 8. No. 4. pp. 187–190. With 1 plate. [8 refs.]

The author examined the blood of a Macaque (*M. cynomolgus*) and found in every field one or more parasites. The young schizonts were pyriform or spherical, with relatively small nucleus, and at first unpigmented. They increased in size and fine granules of yellowish-brown pigment appeared, disposed peripherally. Schizogony produced 4–8 merozoites. Gametocytes were very scarce. Parasitized corpuscles were smaller than the normal and were often much deformed. Schüffner's dots were never seen; pigmented mononuclear leucocytes were present. The affected corpuscles varied in diameter between 4·5 and 6 microns, and the young trophozoites measured 2·5 microns. The author concludes that this Plasmodium differs from both *P. inui* and *P. cynomolgi.*

H. Harold Scott.

LOBO (Vilanova). Sobre a genese provavel da linfocitose encontrada nos sangues normais dos indigenas de Goa. [**Probable Origin of Lymphocytosis met with in Normal Blood of Goanese.**]—*Arquivos Indo-Portugueses de Med. e Historia Nat.* Nova-Goa. 1926. Vol. 3. pp. 1–47. French summary, pp. 47–48.

Besides anaemia there was found in these cases a leucopenia more pronounced in those with splenomegaly in whom malaria parasites were not found. Febrile cases showed a lymphocytosis, apyretic cases in a large percentage, and normal cases [or controls] in a third of those examined. "Monocytes" were increased in numbers and the Arneth count was variable.

C. L.

ALFARO (Gregorio Araoz). La malaria nell' infanzia. [**Malaria in Childhood**].—*Malariologia.* Naples. 1927. Apr. 15. Ser. 3. No. 1. pp. 1–5. [15 refs.]

This paper deals with the well established observations that malaria is essentially an infection of childhood, and that at this age it shows itself in quite unexpected clinical forms. Of the recommendations made one is not stereotyped. It is that the two antimalarial sanitaria for children which exist in the Republic of Argentina, situated in mountain country or in parts not affected by malaria, should be multiplied.

C. L.

BOLOGNESI (Giuseppe). Le jeûne, élément étiologique de récidive de l'infection malarique. [**Fasting in the Causation of Malarial Relapse.**]—*Lyon Chirurgical.* 1926. Sept.–Oct. Vol. 23. No. 5. pp. 563–565.

Referring to experiments by CASAGRANDI, in 1906, in which fasting was a factor in producing relapse in bird malaria, Bolognesi refers to a human case in which he believes that this element was concerned. A woman of 46 swallowed a denture while asleep. It was localized by X-rays in the thoracic portion of the œsophagus, and extracted after great difficulties. In fear of ulceration from lacerations she was kept fasting. On the eighth day the temperature ran up to 41° C. [105·8° F.] with oedema of the neck and upper part of the chest and death 24 hours later. [There was, then, clear evidence of sepsis. Malaria is assumed because she stated that eight years before she had been infected with malaria, but had never had an attack throughout that period. The blood was evidently not examined.]

C. L.

POLECK. Die unbegründete Besorgnis vor der Kriegsmalaria und vor ihren Folgen. [**Unfounded Anxiety about War Malaria and its Effects.**] —*Muench. Med. Woch.* 1927. May 13. Vol. 74. No. 19. pp 812–815. [5 refs.]

There is, apparently, in German lay circles considerable alarm regarding the harm and consequences of malaria, in view of the infections which were introduced into that country at the end of the war. The question of the malaria treatment of paralytics also comes up. Poleck is satisfied of the backing of medical men with colonial experience in combating this unnecessary anxiety.

BROHIER (Sam. L.). **Chronic Malaria and Mania.**—*Gold Coast Rep. Med. & San. Dept. for Period Apr. 1925–Mar. 1926.* Appendix C. pp. 55–58.

The writer describes five cases in which maniacal symptoms were associated with the finding, usually with great difficulty, of a crescent in the blood. Under quinine and detention they all greatly improved or returned to normal.

AMEGHINO (Arturo). Nota sobre las relaciones entre psicosis y paludismo en la República Argentina. [**Relations between Psychosis and Malaria in the Argentine.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 387–392. [18 refs.]

Ameghino urges the need of an investigation into the psychical effects of malaria in children, turning attention to imperfect mental development in those of malarial parents and their predisposition to cerebral abnormalities determined by other causes; to predisposition to other nerve infections and psychopathics among children themselves infected with malaria; and to the question whether malaria can itself produce localized cerebral lesions in infants.

MAJER (Josef). Die Malaria im Säuglings–und Kleinkindesalter. [**Malaria in Babies and Young Children**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Mar. Vol. 31. No. 3. pp. 133–138. With 2 charts in text. [1 ref.]

Tiberias forms no exception to the well-recognized difficulty of making a certain clinical diagnosis of malaria in children.

DI PACE (Ignazio). Un altro caso di orchite di origine malarica. [**Another Case of Malarial Orchitis.**]—*Malariologia.* Naples. 1927. Apr. 15. Ser. 3. No. 1. pp. 5–12. [5 refs.]

There is no mention of blood examination.

and repellents were employed. The writer asks, Can the infection of two thousand men, in spite of all this, be looked upon as a failure or a success? His answer is that, unquestionably, had the work not been undertaken the force would have melted away, and the justification for his belief is the condition of the remnant of the Turkish army who were found in this region.

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This paper deals with the well established observations that malaria is essentially an infection of childhood, and that at this age it shows itself in quite unexpected clinical forms. Of the recommendations made one is not stereotyped. It is that the two antimalarial sanitaria for children which exist in the Republic of Argentina, situated in mountain country or in parts not affected by malaria, should be multiplied.

C. L.

BOLOGNESI (Giuseppe). Le jeûne, élément étiologique de récidive de l'infection malarique. [**Fasting in the Causation of Malarial Relapse.**]—*Lyon Chirurgical.* 1926. Sept.–Oct. Vol. 23. No. 5. pp. 563–565.

Referring to experiments by CASAGRANDI, in 1906, in which fasting was a factor in producing relapse in bird malaria, Bolognesi refers to a human case in which he believes that this element was concerned. A woman of 46 swallowed a denture while asleep. It was localized by X-rays in the thoracic portion of the œsophagus, and extracted after great difficulties. In fear of ulceration from lacerations she was kept fasting. On the eighth day the temperature ran up to 41° C. [105·8° F.] with oedema of the neck and upper part of the chest and death 24 hours later. [There was, then, clear evidence of sepsis. Malaria is assumed because she stated that eight years before she had been infected with malaria, but had never had an attack throughout that period. The blood was evidently not examined.]

C. L.

POLECK. Die unbegründete Besorgnis vor der Kriegsmalaria und vor ihren Folgen. [**Unfounded Anxiety about War Malaria and its Effects.**] —*Muench. Med. Woch.* 1927. May 13. Vol. 74. No. 19. pp 812–815. [5 refs.]

There is, apparently, in German lay circles considerable alarm regarding the harm and consequences of malaria, in view of the infections which were introduced into that country at the end of the war. The question of the malaria treatment of paralytics also comes up. Poleck is satisfied of the backing of medical men with colonial experience in combating this unnecessary anxiety.

BROHIER (Sam. L.). **Chronic Malaria and Mania.**—*Gold Coast Rep. Med. & San. Dept. for Period Apr. 1925–Mar. 1926.* Appendix C. pp. 55–58.

The writer describes five cases in which maniacal symptoms were associated with the finding, usually with great difficulty, of a crescent in the blood. Under quinine and detention they all greatly improved or returned to normal.

AMEGHINO (Arturo). Nota sobre las relaciones entre psicosis y paludismo en la República Argentina. [**Relations between Psychosis and Malaria in the Argentine.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 387–392. [18 refs.]

Ameghino urges the need of an investigation into the psychical effects of malaria in children, turning attention to imperfect mental development in those of malarial parents and their predisposition to cerebral abnormalities determined by other causes; to predisposition to other nerve infections and psychopathics among children themselves infected with malaria; and to the question whether malaria can itself produce localized cerebral lesions in infants.

MAJER (Josef). Die Malaria im Säuglings–und Kleinkindesalter. [**Malaria in Babies and Young Children**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Mar. Vol. 31. No. 3. pp. 133–138. With 2 charts in text. [1 ref.]

Tiberias forms no exception to the well-recognized difficulty of making a certain clinical diagnosis of malaria in children.

DI PACE (Ignazio). Un altro caso di orchite di origine malarica. [**Another Case of Malarial Orchitis.**]—*Malariologia.* Naples. 1927. Apr. 15. Ser. 3. No. 1. pp. 5–12. [5 refs.]

There is no mention of blood examination.

BOREL (M.). Résultats d'une enquête malariologique à Dalat (Cochinchine). [**Malaria Findings at Dalat (Cochin China).**]—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 427-434.

Dalat is apparently being laid out as a local hill station for recreation and recuperation, and the land seems to slope down rapidly into malarious valleys, the plateau of Langbian itself being free. Local anopheles now reported for the first time are *A. fuliginosus*, *A. sinensis* and *A. maculatus*, but whether in the station or outside it does not seem clear.

NOCHELL (W.). [Beitrag zum Studium der Malaria in Mazedonien.] [**Malaria in Macedonia.**]—*Glasnik Centralnog Higijenskog Zavoda*, Belgrad. 1926. Vol. 1. No. 1-4. pp. 95-119. [Summarized in *Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Feb. Vol. 31. No. 2. p. 93.]

In a Macedonian region the percentage of gametocyte carriers was the same throughout the year, parasites persisting in spite of season. Tertian malaria reached its maximum in July–August, subtertian in August–September and quartan in October–November. May, in the author's findings, is the best month for development of plasmodia in man and anopheles.

RONNEFELDT (F.). Zur Epidemiologie der Malaria in Rumänien. [**Epidemiology of Malaria in Rumania.**]—*Arch. f. Schiffs-u. Trop.-Hyg.* 1927. Feb. Vol. 31. No. 2. pp. 88–89.

Talmesch, a mountain village, 40 km. south of Hermannstadt in Rumania, is implicated as a centre of quartan malaria.

LOVEWELL (C. H.). **Malaria at Camp Stotsenburg.**—*Milit. Surgeon.* 1927. June. Vol. 60. No. 6. pp. 683–700. With 4 charts & 8 figs. on 2 plates. [1 ref.]

Application of the usual antimalarial measures, particularly clearing of streams, flushing, and the use of Paris green has been followed by a reduction of the malaria rate from 137 to 65 in two years.

C. L.

ALVAREZ (Washington). Paludismo y gestación.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16. pp. 402–406.

ALVAREZ SOTO (Napoleon) & QUINTANA (Hector). El mercurocromo 220 en su acción sobre el paludismo.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. Nos. 14, 15 & 16, pp. 378–386. With 8 charts.

BINI (Guido). La lotta antimalarica a Fiumicino.—*Policlinico.* Sez. Prat. 1926. Oct. 18. Vol. 33. No. 42. p. 1464.

CARDAMATIS (Jean P.). Le traitement de la fièvre paludéenne.—*Grèce Méd.* 1926. Nov.-Dec. Vol. 28. No. 11-12. pp. 41-46. [14 refs.]

CHARRIER (H.) & REMLINGER (P.). Contribution à l'étude de la protection de Tanger contre le paludisme.—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 45–51. With 1 map in text.

HOSOMI (Shinji) & YOSHINO (Masutaka). On the Malaria Treatment against General Paralysis paying Special Attention toward Malaria Plasmodiae.—*Sei-I-Kwai-Med. Jl.* 1927. Feb. Vol. 46. No. 2. English summary pp. 10–12. [In Japanese.]

JAMES (S. P.). Sur le traitement de la paralysie générale par l'inoculation du paludisme.—*Bull. Office Internt. d'Hyg. Publique,* 1926. Dec. Vol. 18. No. 12. pp. 1397–1398. [1 ref.]

JANDULA (Ricardo). Nefritis subaguda en un paludismo tipo terciano. Tratamiento. Evolución.—*Bol. Inst. Clin. Quirúg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 393–401. With 2 charts.

JOFFE (H.). [About Malaria Therapeutics.]—*Harefuah.* Jerusalem. 1927. Apr. Vol. 2. No. 2. p. 390–393. [In Hebrew.]

KRISHNAMURTY (Ch.). Pernicious Forms of Malaria at Sompeta, Ganjam District.—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. pp. 144–145.

Lupu (N. Gh.) & Missirliu (Vl.). Un cas de paludisme chronique avec polynucléose.—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1927. Feb. Vol. 9. No. 2. pp. 19–23.

Martini (E.). Zur Frage der therapeutischen Malaria.—*Muench. Med. Woch.* 1927. June 10. Vol. 74. No. 23. pp. 980–981.

Mosto (Domingo) & Brachetto Brian (Domingo). Sobre la anatomia patológica del paludismo.—*Semana Méd.* 1927. May 5. Vol. 34. No. 18 (1738). pp. 1105–1108. [2 refs.]

Nauck (Ernst G.). Altchinesische Medizin und Malaria.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. pp. 197–201.

Negro (Francesco). Influenza della malaria sullo sviluppo fisico.—*Riforma Med.* 1927. May 23. Vol. 43. No. 21. pp. 491–492.

De Peñalva Torino (Tomàs D.). Distribución geográfica de la caries dentaria en el norte argentino y probable influencia del paludismo en su etiología. —*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 416–421.

Peroni (Giacomo). Sur le traitement du paludisme par la *Smalarina Cremonese* (A propos de la communication de M. E. W. Suldey).—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 304–305.

Quintana (Héctor) & Alvarez Soto (Napoleón). La berberina en el tratamiento del paludismo.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 360–362.

Schapiro (L.). [The Resistance of Erythrocites to Solutions of NaCI and its Diagnostic Importance in Typhoid Fever and Malaria.]—*Harefuah.* Jerusalem. 1927. Apr. Vol. 2. No. 2. pp. 375–382. [In Hebrew.]

Sola (Eduardo). Gastrorragia abundante en palúdica grávida a termino.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 488–491.

Waldorp (C. P.). Endocrinopatías en los palúdicos.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 407–415. [15 refs.]

Yoshino (Masutaka). On the Possibility of Inoculation of *Plasmodium malariae* of Human Origin in Animal Tests.—*Sei-I-Kwai-Med. Jl.* 1926. Nov. Vol. 45. No. 5. English Summary, pp. 11–12. [In Japanese.]

## RABIES: A REVIEW OF RECENT ARTICLES. VII*

### i. *Geographical Distribution.*

The Pretoria correspondent of the *British Medical Journal* (June 11th, 1927), draws attention to the general question of the existence of rabies in the Union of South Africa. Since 1916, six cases exhibiting the symptoms of rabies have been reported. but unfortunately in no case has a definite pathological diagnosis been made. Every case ended fatally. The infecting animal appears in most instances to have been the yellow mongoose (*Cynictus pencillata*), and in one case the wild cat or genet was to blame.

Krige[1] describes a further group of cases from Standerton. A boy died apparently of rabies after having been bitten both by a dog and by a "rooi merkat." At a neighbouring village two further cases were reported to have occurred. These were bitten by a puppy which had also bitten several pigs and two natives. One of these bitten persons died, and both pigs "went mad." This outbreak is being investigated by the Health Department, and a full report will be published.

Ciotola and Alongi[2] discuss a recent epidemic of rabies in Eritrea. The virus like that of West Africa exists as a rule in a much attenuated state. In certain circumstances virulence becomes enhanced, in which case the virus does not differ in any respect from that met with in European countries.

### ii. *The Virus.*

Levaditi, Nicolau and Schoen[3] present their case in favour of the protozoal nature of the rabies virus. The article is fully illustrated. They believe that fixed virus is a mutative variety of the *Glygea lyssae* with strictly neurotropic affinities, which are related to the animal in which mutation has occurred. The characteristic feature of fixed virus is that it has definitely lost the pansporoblastic phase of the intracellular evolutionary cycle. Some strains of street virus are more easily transformed than others; some are totally refractory. A number of strains have been examined. The general characters of these strains form the subject matter of a note by Remlinger[4]. Ravina[5] furnishes a general summary of the work of Levaditi and his collaborators. Paul and Schweinburg[6] contribute a very comprehensive article on morphological characters, and review a large number of staining methods. They uphold the parasitic nature of the Negri body, but point out, that whilst in protozoa one finds a chromatin nucleus in basophil protoplasm, the "innenkörper" of the Negri body are always basophil, and have not the characters of nuclei. They do not accept the view that the Negri body is a degeneration product, and are also not satisfied with the Chlamydozoon theory. They believe that the small bodies originally described by J. KOCH are the precursors of the Negri body. The whole question was discussed at the International Rabies Conference, whose resolutions have already been brought to notice (*ante*, p. 483).

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* For the sixth of this series see this Volume, pp. 222–231.

[1] Krige (C. F.). A Case of Hydrophobia (?).—*Jl. Med. Assoc. S. Africa.* 1927. Apr. 9. Vol. 1. No. 7. pp. 173–174.

[2] Ciotola (Alberto) & Alongi (Giuseppe). Sull' epizoozia di rabbia sviluppatasi nella colonia Eritrea nel biennio 1925–1926.—*Arch. Ital. Sci. Med. Colon.* 1927. Feb. Vol. 8. No. 2. pp. 63–76. With 1 text fig. [10 refs.]

[3] Levaditi (C.), Nicolau (S.) & Schoen (R.). Recherches sur la rage.—*Ann. Inst. Pasteur.* 1926. Dec. Vol. 40. No. 12. pp. 973–1069. With 14 text figs., 19 curves & 1 plate (coloured). [Numerous refs.]

[4] Remlinger (P.). Note sur les virus de rue envoyés de Tanger à M. Levaditi.—*Ann. Inst. Pasteur.* 1926. Dec. Vol. 40. No. 12. pp. 1070–1074.

[5] Ravina (A.). Recherches récentes sur la nature du virus rabique.—*Presse Méd.* 1927. Mar. 12. Vol. 35. No. 21. pp. 324–326. [9 refs.]

[6] Paul (Fritz) & Schweinburg (Fritz). Zur Morphologie des Lyssaerregers.—*Virchows Arch. f. Path. Anat. u. Physiol.* 1926. Oct. 28. Vol. 262. No. 1. pp. 164–210. With 11 text figs. (5 coloured.) [85 refs.]

Pereira DA SILVA[7] having found Negri bodies in the medulla, but not in the hippocampus of a human case of rabies, conceived the idea that a similar state of affairs might be found in cases of fixed virus rabies in which the incubation period was unduly prolonged. A rabbit was inoculated with a mixture of serum and fixed virus, and developed symptoms in 26 days. No Negri bodies were observed in the hippocampus, but small bodies, some punctiform and some with less well defined margins, were found in the medulla. Their staining reactions were those of Negri bodies, and in appearance they were similar in all respects to the small bodies found in the medullas of rabbits inoculated with street virus. Following LEVADITI and his collaborators who found that in the mutation from street virus to fixed virus, the disappearance of the more complex Negri bodies occurred first in the hippocampus, DA SILVA considers that it is logical to expect that in an inverse mutation the earliest visible forms would be small punctiform bodies, and that their first appearance would not be in the hippocampus. LEVADITI and his co-workers from their experiments have concluded that the mutation from street to fixed virus is irreversible; DA SILVA suggests that a reversion may be possible if the incubation period be prolonged by artificial means, as for example by using serum-virus mixtures.

Further facts relating to the characteristics of various strains of fixed virus are reported. It will be remembered that the Tangiers strain shows considerable modification, that the Rome virus has suffered a loss of virulence with regard to its infectivity on intracorneal inoculation, that the Algiers virus has lost virulence with regard to desiccation and to the action of glycerine, but remains unaltered as regards intracorneal inoculation. MARIE[8] reports that the Paris strain is just as virulent as it was in the time of PASTEUR, as tested by guineapig inoculation. The virulence is, however, not correlated to the age of the medulla. Thus a one day dried cord gives an incubation of nine days, and a six day dried cord infects with the same incubation period.

ROCHAIX[9] has found no evidence of attenuation of the Lyons virus which is in its 1,216th passage, and agrees with MARIE that there is no correlation between the number of days of drying and the length of the incubation period.

REMLINGER and BAILLY[10] from further experiments in Tangiers find that whilst the street virus of that locality shows a mortality of 100 per cent. on intracorneal inoculation, the Tangiers strain of fixed virus (2,360th passage) infects by a similar route in only 14 per cent. of cases. They believe that a marked mutation has taken place, and raise the question as to whether a younger strain might not be more potent as an immunizing agent.

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[7] DA SILVA (E. Pereira). Corps de Negri et virus fixe.—*C.R. Soc. Biol.* 1927. May 20. Vol. 96. No. 16. pp. 1342–1344. [4 refs.]

[8] MARIE (A. C.). Pouvoir pathogène du virus rabique fixe.—*Ann. Inst. Pasteur.* 1927. Jan. Vol. 41. No. 1. pp. 45–48. [6 refs.]

[9] ROCHAIX (A.) Sur la virulence des moelles utilisées pour les vaccinations pastoriennes contre la rage.—*C.R. Soc. Biol.* 1927. May 20. Vol. 96. No. 16. pp. 1318–1320. [3 refs.]

[10] REMLINGER (P.) & BAILLY (J.). Sur l'atténuation du virus rabique fixe pour la chambre antérieure de l'oeil.—*C.R. Soc. Biol.* 1927. Apr. 1. Vol. 96. No. 12. pp. 824–826.

**Girard** and **Robic**[11] draw attention to the effect of temperature upon deterioration. Whilst glycerinated cords (1, 2 and 3 day dried) retain their virulence for 20 days at a temperature of 10° C., virulence is lost within 10 days at a temperature of 20° C.

**Bablet, Advier** and **Souchard**[12] find that the virus of Cochin China resists desiccation for from 7 to 9 days, and the effects of dehydration by glycerine for from 30 to 34 days. The conservation of virus in glycerine is inversely and regularly proportional to the duration of the previous desiccation. Thus 2 day cords retain their potency in glycerine for 20 days, 3 or 4 day cords for 15 days, 5 or 6 for 10 days, and 7 or 8 day cords for 5 days.

**Bennett**[13] has investigated street virus from cases which occurred in the Anglo-Egyptian Sudan. The disease was introduced into this district in 1926 apparently from Central Africa. It caused furious rabies in animals, and some human beings were infected. From various experiments the author concludes that there is no special African virus.

**Cowdry**[14] describes ex[illegible] sent to the Rockefeller Institute from Japan by Dr. Kobayashi. An outbreak of encephalitis had occurred, which had a case mortality of 50 per cent., and had caused in all 4,000 deaths. After many failures a strain of virus was transmitted to the rabbit. This strain in the hands of **Cowdry** gave rise to inclusion bodies similar to those of rabies. Cross immunization experiments with the rabies virus showed that either virus protected against the other. From the symptomatic picture, the pathological findings and the cross immunization experiments, the writer concludes that Kobayashi virus was indistinguishable from ordinary rabies virus.

### iii. *Symptoms and Diagnosis.*

**Remlinger**[15] enquires into the existence of consumptive rabies. In dogs, bitten or inoculated, emaciation and death ten to twelve days after the onset of symptoms may occur in exceptional cases. In laboratory animals, with the exception of monkeys and birds, the same termination is seen after inoculation with fixed and street viruses, but only very rarely. Whilst not denying the possible existence of a true consumptive form, **Remlinger** draws attention to its extreme rarity. He considers that the only proof would be the exaltation of virulence on continued subpassage. (For experiments of this nature see **Lamb** and **McKendrick**, 1909, Sc. Mem., Govt. of India. No. 36.)

**Ionnesco**[16] describes three cases of "râge imaginaire," and discusses the relative diagnosis.

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[11] **Girard** (G.) & **Robic** (J.). Influence de la température à laquelle sont conservées les moelles rabiques glycérinées sur la durée de leur virulence.—*C.R. Soc. Biol.* 1927. Apr. 26. Vol. 96. No. 13. pp. 952–953.

[12] **Bablet, Advier** & **Souchard**. Recherches expérimentales sur le virus rabique des rues en Cochinchine.—*Ann. Inst. Pasteur.* 1927. Feb. Vol. 41. No. 2. pp. 199–200. [1 ref.]

[13] **Bennett** (S. C. J.). A Note on the Nature of the Rabies Virus in the Anglo-Egyptian Sudan.—*Vet. Jl.* 1927. Mar. Vol. 83. No. 3. pp. 123–126.

[14] **Cowdry** (E. V.). Comparison of a Virus obtained by Kobayashi from Cases of Epidemic Encephalitis with the Virus of Rabies.—*Jl. Experim. Med.* 1927. May 1. Vol. 45. No. 5. pp. 799–806. [4 refs.]

[15] **Remlinger** (P.). Existe-t-il une rage consomptive ?—*C.R. Soc. Biol.* 1927. Feb. 25. Vol. 96. No. 7. pp. 456–458. [4 refs.]

[16] **Ionnesco** (Demetre). Les troubles psychiques à la suite du traitement antirabique et le diagnostic differentiel de la rage.—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1927. Jan. Vol. 9. No. 1. pp. 13–18.

**Davies**[17] describes a case of hydrophobia in which doses of 1/150 gr. of atropine sulphate, every five hours, controlled the laryngeal spasm over a period of four and a half days. The patient ultimately died of heart failure.

**Lindeman**[18] describes three cases diagnosed as nervous distemper in dogs. The brains of two of these contained Negri bodies; the first was killed on the eighth day of sickness, and the second died 22 days after developing symptoms.

**Loewenthal**[19] examined a cat's brain in which, whilst no Negri bodies were present in the horn of Ammon, inclusion bodies—with vacuolization, but no "innen körper"—were found in a neighbouring area. Two rabbits were inoculated from the brain of the cat; both remained free from symptoms (12 weeks). He refers to **Luzzani** and **Jastrembsky**'s statement that inclusions may be found in the brains of normal cats.

### iv. *Pathology.*

Three papers relate to the changes [illegible] occurring during the course of the disease in inoculated animals. **Esquivel** and **Lasta**[20] examined eighteen animals and found an increase above the normal of 80 per cent. in the polymorphonuclear leucocytes, and a decrease of 60 per cent. in the lymphocytes. The variations in the large mononuclears were inconstant. Eosinophils and basophils were also decreased. In two control animals inoculated with normal brain substance no variation was observed. **Cremona** and **Serravalle**[21] examined the blood of animals treated with Finzi's mixed hetero-homologous vaccine, and found similar variations. **Ohashi**[22] traced the course of the variations from day to day and found that the polymorphonuclear leucocytes after a preliminary decrease, commenced to increase with the onset of symptoms, and attained just before death to twice the normal proportion. The lymphocytes increased initially, and finally fell to one seventh normal. The large mononuclears increased to twice normal. Control animals treated with normal brain showed no change. All these writers believe the change to be of a specific nature.

**Löwenberg**[23] has examined the cerebro-spinal fluid of four cases of human rabies with respect to their cell count and their colloid reactions. His results are somewhat irregular, but he believes that acute cases with meningitis and a high phagocytosis may occur without exhibiting the usual colloid reactions characteristic of meningitis.

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[17] Davies (G. R.). A Case of Human Hydrophobia at Moyale.—*Kenya Med. Jl.* 1927. Jan. Vol. 3. No. 10. pp. 292–294.

[18] Lindeman (S. J. L.). Difficulties in the Differential Diagnosis between Rabies and Nervous Forms of Distemper.—*Jl. Roy. Army Med. Corps.* 1927. Apr. Vol. 48. No. 4. pp. 303–306.

[19] Loewenthal (Waldemar). Eine Fehldiagnose auf Wut?—*Cent. f. Bakt.* I. Abt. Orig. 1927. Feb. 5. Vol. 101. No. 6–7. pp. 393–396. With 1 text fig. & 4 figs. on 1 coloured plate.

[20] Esquivel (Ricardo) & Lasta (Clemente G.). La formula leucocitaria en la rabia.—*Semana Méd.* 1927. Mar. 31. Vol. 34. No. 13. (1733). pp. 804–815. With 18 charts.

[21] Cremona (P.) & Serravalle (G.). Formule leucocytaire au cours de la vaccination antirabique chez les chiens traités avec le vaccin mixte hétérohomologue de Finzi.—*Rev. Path. Comp. et Hyg. Générale.* 1926. Dec. 20. Vol. 26. No. 315. pp. 980–986. With 2 charts in text.

[22] Ohashi (Mmsanosuke). On the Changes in the Blood and the Distribution of the Virus in Rabid Animals.—*Ann. Rep. Vet. Laboratory, Nishigahara, Tokyo, Japan, for Year 1925.* Appendix pp. 73–80. [6 refs.]

[23] Löwenberg (Konstantin). Der Liquor cerebrospinalis bei menschlicher Lyssa.—*Muench. Med. Woch.* 1926. Dec. 24. Vol. 73. No. 52. pp. 2203–2204.

MARIE[24] extends previous observations on the presence of cholesterin in the blood and tissues of rabbits which had received an intracerebral dose of fixed virus. He had found a three or four-fold rise in the blood serum using the method of Grigaut. He has investigated the content of the bulbo-protuberantial portion of the suprarenals, and finds variations rising to 30 per thousand. A corresponding decrease takes place in the brain.

REMLINGER and BAILLY[25] examine the statement of QUAST that fixed virus is present at the end of treatment in the brains of dogs which have received treatment by the Högyes Phillips method. Using Calmette's method of treatment on 15 animals (5 cats, 5 rabbits and 5 guineapigs) he failed to demonstrate the presence of fixed virus by animal inoculation, up to the 10th day after treatment. Negative results also followed from 3 dogs tested 0, 5 and 18 days after completion of this treatment, and also in the case of 5 dogs treated by the Phillips-Boecker method. The writers conclude that the demonstration of fixed virus in the brain of a treated animal is a true indication that an animal has died of fixed virus rabies.

Rabicidal properties have been demonstrated by KONDO[26] in the sera of rabbits which have received intravenous injections of fixed virus over a period of 42 days. The sera were examined on the 21st day after completion of treatment. Although no agglutinins, precipitins or complement fixing substances could be demonstrated, KONDO found that the serum was slightly rabicidal. The serum of naturally immune or refractory animals possessed the same property, whilst that of normal rabbits and of those treated with normal brain substance were practically inactive. This property vanished when the serum was heated to 80° C. for 30 minutes, but was unaffected by heating at 70° C. for the same period. The best results were obtained by keeping the virus serum mixture at 37° C. for 2 hours before administration.

SPERANSKY[27] (Leningrad) contributes an interesting article in which an unusual type of experimentation is developed. He believes that the symptoms of rabies are characteristic of lesions in the subcortical parts of the brain, in those centres which have to do with combined automatic movements. They are not specific, and appear to be similar to those which follow other toxic processes such as tetanus, strychnine poisoning, and even toxic encephalitis. A tendency to biting is a recognised characteristic of decerebrated dogs and cats. By injecting 3 cc. of antirabic serum under the dura mater the author succeeded in prolonging the incubation period. Again by repeated withdrawings of the cerebro-spinal fluid by suboccipital puncture of the sac of the dura mater, the incubation period was prolonged. He claims that simple contact of virus with the surface of the brain is insufficient to give rise to infection and that propagation by means of the cerebrospinal fluid is necessary for the development of the disease process. In the case of three dogs a part of the subdural space was isolated by previous operation. Sometime afterwards five lethal doses of fixed virus were introduced into the isolated "ventricle." In two of the dogs there was a 3 to 4 days prolongation of the incubation period; the third survived. He concludes that the free flow of the cerebro-spinal fluid is necessary for the penetration of the virus into the subcortical areas. The author has commenced experiments on active immunization by the introduction of vaccine into the subdural space. The results so far are inconclusive.

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[24] MARIE (A. C.). Variations de la cholestérine au cours de l'infection rabique.—*Ann. Inst. Pasteur.* 1927. Feb. Vol. 41. No. 2. pp. 195–198. With 1 chart in text. [2 refs.]

[25] REMLINGER (P.) & BAILLY (J.). Le virus fixe passe-t-il dans le système nerveux central au cours du traitement antirabique ?—*C.R. Soc. Biol.* 1927. Mar. 18. Vol. 96. No. 10. pp. 683–684. [1 ref.]

[26] KONDO (Shoichi). On the Rabicidal Property of Anti-Rabies Serum.—*Ann. Rep. Vet. Laboratory, Nishigahara, Tokyo, Japan, for Year 1925.* Appendix. pp. 47–59. [11 refs.]

[27] SPERANSKY (A.). Faits nouveaux sur la pathogénie et la prophylaxie de la rage.—*Ann. Inst. Pasteur.* 1927. Feb. Vol. 41. No. 2. pp. 166–188. With 5 text figs. [4 refs.]

v. *Methods of Treatment.*

It is interesting to note that all except two of the communications which relate to this section are concerned with treatment by means of dead vaccines. The disinfectant material may be phenol, formalin, or ether, and the process of killing may be carried out at room temperature, blood heat, or at 60° C. It does not seem to be material which method is employed. The general conclusion arrived at is that, as in the case of bacterial vaccines, risk is excluded, and a solid immunity can be obtained by the use of dead material. This conclusion was also arrived at after full discussion at the International Rabies Conference. It was also resolved that comparative tests be carried out with vaccines killed by various methods. The main point is that dead vaccines are safer than living, and that in suitable dosage they induce a solid immunity. Thus Schmidt-Weyland[28] established immunity in mice both by the use of fixed virus brain heated at 60° C. for 2 hours, and by 1 per cent. carbolized virus. As the result of a number of experiments, he was unable to obtain a degree of immunity with fresh vaccine, in doses approximating to the lethal dose, higher than that obtained by dead vaccines, nor did he find that 1 and 2 day cords gave a higher immunity than 3 day cords. Herrmann[29] using his "58–60" Vaccine (in 0·5 per cent. phenol, heated at 58 to 60° C. for half an hour), claims that he obtained as good results as by the use of fully virulent emulsions. And V. Puntoni[30], who uses an attenuated, but not killed, carbolized virus in Rome, and a dead vaccine in his outlying dispensaries, experienced a total mortality of 0·16 per cent. in each group. Herrmann[31] in a second paper examined glycerinated cords and found that they did not maintain a definite strength.

Marie and Mutermilch[32] achieved a considerable degree of immunity in rabbits which had on three occasions received 0·5 cc. of a 1/20 emulsion of brain etherized for 5 to 6 days at room temperature. They conclude that the intrarachidian path of inoculation is effective against the severest test even when the dosage is small (1·5 cc. ether virus).

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[28] Schmidt-Weyland (Paul). Immunisierungsversuche gegen Lyssa an Mäusen.—*Ztschr. f. Hyg. u. Infektionskr.* 1927. Apr. 29. Vol. 107. No. 2. pp. 436–440. [1 ref.]

[29] Herrmann (Otto). Vergleich der Immunisationsfähigkeit der virulenten antirabischen ex tempore hergestellten Emulsion, der abgetöteten konservierten Vakzine "58–60" und der normalen Nervensubstanz.—*Cent. f. Bakt.* I. Abt. Orig. 1927. May 12. Vol. 102. No. 6-7. pp. 390–397.

[30] Puntoni (V.). La vaccinazione antirabica con i vaccini fenicati. Sei anni di applicazione nell' Instituto Antirabico di Roma.—*Ann. d'Igiene.* 1926. Nov. Vol. 36. No. 11. pp. 765–786. [13 refs.]

[31] Herrmann (Otto). Ueber die Veränderung der Virulenz des in Glyzerin konservierten Virus fixe.—*Cent. f. Bakt.* I. Abt. Orig. 1927. May 12. Vol. 102. No. 6-7. pp. 406–412. [3 refs.]

[32] Marie (A. C.) & Mutermilch (S.). Essais de vaccination antirabique du lapin par la voie méningée.—*C.R. Acad. Sci.* 1927. Apr. 4. Vol. 184. No. 14. pp. 911–913. [3 refs.]

PLANTUREUX[33] sugg[illegible] dextrin ([illegible] per cent.), in phenol serum [illegible]m. He gives preference to the last.

COSTA, BOYER and PLACIDI,[34] using formolysed vaccines, were in some instances able to protect against intraocular injection, but never against intracranial.

NICHOLLS and BURGESS[35] describe the preparation and use of the carbolized vaccine in use in Ceylon.

REMLINGER and BAILLY[36] point out that paralytic accidents are not so rare in dogs as they are in man. Amongst five dogs treated with glycerinated cords he observed one case of paralytic accident, and amongst a second group of five treated by the Phillips method a further case occurred. Both were cases of *râge laboratoire.*

These authors[37] also turn to the possibility of the immunity against rabies being local in the Besredka sense. They immunized eighteen guineapigs by eight cutaneous applications (with friction) of etherized cords. Eight of these received a test dose of fixed virus rubbed on the skin; all survived (as compared with eight controls, two of which survived). The remaining ten were inoculated with street virus; six survived (as compared with 10 controls of which all died). Two other experiments carried out with the same object gave indefinite results. They conclude, however, that there is some evidence in favour of a local immunity.

### vi. *Statistics.*

OUCHAKOW[38] presents statistics from Leningrad, where 2 and 3 day dried cords are used. Amongst 2,018 persons treated five died or a total mortality of 0·24, and a reduced mortality of 0·14.

ROCHAIX[39] reports no deaths amongst 327 persons treated at Lyons and VIALA[40] no deaths amongst 634 at Paris. At Tunis[41] three deaths occurred amongst 789 persons treated, one of which was a failure. From Madrid, RAMÓN Y FAÑANÁS[42] reports one death amongst 1,377 treated by the Högyes method.

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[33] PLANTUREUX (E.). Recherches sur la rage. Nouvelles méthodes de traitement antirabique.—*Arch. Inst. Pasteur d'Algérie.* 1926. Dec. Vol. 4. No. 4. pp. 528–572. [56 refs.]

[34] COSTA (S.), BOYER & PLACIDI (L.). Essai de vaccination antirabique par un vaccin formolé.—*C.R. Soc. Biol.* 1927. Feb. 4. Vol. 96. No. 4. pp. 293–294. [6 refs.]

[35] NICHOLLS (Lucius) & BURGESS (Edwin). The Preparation of an Anti-Rabies Vaccine.—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.) 1927. Mar. 16. Vol. 2. Pt. 1. pp. 13–19. With 3 text figs.

[36] REMLINGER (P.) & BAILLY (J.). Paralysies au cours du traitement antirabique chez le chien. Application possible à l'étude des accidents paralytiques de l'homme.—*C.R. Soc. Biol.* 1927. Mar. 25. Vol. 96. No. 11. pp. 772–773.

[37] REMLINGER (P.) & BAILLY (J.). Contribution à l'étude de la vaccination locale dans la rage.—*C.R. Soc. Biol.* 1927. Apr. 1. Vol. 96. No. 12. pp. 826–827.

[38] OUCHAKOW (W. G.). Rapport annuel pour 1925 du service antirabique à l'institut de médecine expérimentale.—*Arch. Sci. Biol.* 1926. Vol. 26. No. 4–5. French summary p. 388. [In Russian, pp. 279–288. 5 refs.]

[39] ROCHAIX (A.). Le traitement antirabique dans la région lyonnaise en 1925.—*Jl. Physiol. et Path. Gén.* 1927. Mar. Vol. 25. No. 1. pp. 73–75.

[40] VIALA (Jules). Les vaccinations antirabiques à l'Institut Pasteur en 1926.—*Ann. Inst. Pasteur.* 1927. Apr. Vol. 41. No. 4. pp. 483–487.

[41] ARCHIVES DE L'INSTITUT PASTEUR DE TUNIS. 1927. Apr. Vol. 16. No. 1. pp. 99–117. Fonctionnement des services de l'Institut Pasteur pendant l'année 1926.

VAN GENDEREN[43] discusses the rel[illegible] by carbolized vaccines, and by Höyges method, and in par[illegible] the statistics of the Pasteur Institute [illegible] emphasizes the recognized variability of the factors relating to the type of population treated at different institutes. The only satisfactory comparison of two methods of treatment appears to be the treatment of alternate cases at one and the same institute. VAN GENDEREN gives the results of a comparative test carried out in Java, in which 646 persons were treated by Högyes method and 444 persons by the Indian method. The method of alternate cases was evidently not employed. The results were in favour of Högyes method, but VAN GENDEREN realizes that the differences are not necessarily significant. It may be interesting in this connexion to point out that a comparative test of the efficacies of carbolized and ether vaccines is at present being carried out at Kasauli. Although over 900 cases have been treated with ether vaccine, the Director does not consider that this number is sufficient for definite conclusions to be drawn. It should also be remembered that at various periods the patients at Kasauli have been treated by dried cords, fresh dilutions, and carbolized vaccine, and the conclusion has been arrived at that the results following the administration of carbolized vaccine are at least as good as those following the two other methods of treatment—a conclusion towards which those who have conducted comparative tests on animals are steadily tending. The changes in treatment which have been made at Kasauli have been based upon animal experiment, as well as upon statistics, and have been influenced in no small measure by the absolute innocuousness of treatment by carbolized vaccines.

### vii. *Canine Rabies.*

UMENO[44] publishes the following statistics relating to the preventive inoculation of dogs in Tokyo. The vaccine is that of Umeno and Doi.

| | *Non-inoculated registered dogs.* | | | *Inoculated registered dogs.* | | |
|---|---|---|---|---|---|---|
| *Year.* | *Number.* | *Rabies.* | *Mortality.* | *Number.* | *Rabies.* | *Mortality.* |
| 1921 ... | 3,886 | 179 | 4·61 | 22,181 | 6 | 0·02 |
| 1922 ... | 1,188 | 92 | 7·74 | 24,282 | 19 | 0·08 |
| 1923 ... | 6,780 | 42 | 0·68 | 19,959 | 7 | 0·03 |
| 1924 ... | 2,279 | 166 | 7·23 | 24,150 | 43 | 0·18 |
| 1925 ... | 7,835 | 50 | 6·38 | 27,579 | 30 | 0·11 |

Of the inoculated dogs 17 developed rabies within 2 weeks after inoculation (6 in 1921, 4 in 1922, and 7 in 1924—the figures for 1925 are not yet available).

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[42] RAMÓN Y FAÑANÁS (J.). Estadística de los casos tratados por el método antirrábico de Högyes en el Instituto Nacional de Higiene de Alfonso XIII durante los años 1924 y 1925.—*Arch. Inst. Nac Higiene de Alfonso XIII.* 1926. Oct. Vol. 4. No. 4. pp. 111–115.

[43] VAN DEN HOVEN VAN GENDEREN (Jeanne). Resultaten der voorbehandeling van door dolle honden gebeten personen der Buitengewesten met door carbol gedood virus-fixe. Opmerkingen over de Britsch-Indische statistieken der antirabies-behandeling en over lyssa-statistieken in het algemeen.—*Geneesk. Tijdschr. v. Nederl.-Indië* 1926. Vol. 66. No. 6. pp. 760–786.

[44] UMENO (Shinkichi). Preventive Inoculation of Dogs against Rabies.—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2.pp. 527–531.

Schern[45] gives results of post infectional immunization with single doses of fresh virus upon dogs which had been bitten by rabid dogs and which received their treatment less than 14 days after having been bitten. Out of 18 dogs so treated none developed rabies. The author states that other dogs bitten by the same rabid dogs developed the disease. He is of the opinion that in general 40 per cent. of the untreated die.

Kondo[46] examines the effect of temperature upon the Japanese vaccine. He obtained the most satisfactory results with vaccines which had been kept at 37° C. for 3 days. He states that the immunity in the dog after doses of 5 cc. lasts for about a year. He summarizes the Japanese experience as follows. During the years 1918 to 1925, of 755,072 treated dogs 170 have developed rabies; of 115 cattle, 5 have died of 69 horses, 2 have died; of 7 sheep, 4 have succumbed; and of 5 goats 2 have developed rabies. The remainder, including 2 swine, remained well for a year after treatment was afforded.

Bailly[47] reports that four horses and two mules treated by Remlinger's etherized virus remained well—the horses after 9 months, and the mules after 5 months. Each animal received 8 grammes of nerve substance.

Crawford[48] has treated three horses with carbolized virus (Semple) in doses of 10 cc. of a 5 per cent. emulsion. Of these two died of rabies, whereas of two horses which had not received treatment both died.

Bailly[49] used Remlinger's ether vaccine preventively upon 39 dogs giving three doses, each consisting of a fixed virus brain, the first after 25 hours immersion in ether, the second after 20 hours immersion, and the third after 15 hours immersion. Each dose was emulsified in 40 cc. of physiological saline. No accidents, paralytic sequelae or wasting were observed, in spite of the high doses employed. A solid immunity was developed in all the treated animals, whilst on the other hand 7 out of 11 controls developed the disease.

Miessner and Baars[50], after a statistical survey of canine rabies in Germany, contrast and extend previous observations on the immunizing properties of fresh virus, Umeno and Doi's vaccine, and Lyssin (this *Bulletin*, Vol. 23, p. 698) and find that Lyssin is as potent as fresh virus. In a further paper Baars[51] gives a résumé of this work.

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[45] Schern (Kurt). Postinfektionelle Immunisierungsversuche sowie Immunisierungsversuche in Verdachtsfällen gegen Tollwut unter den Bedingungen der Praxis.—*Berlin. Tierärzt. Woch.* 1927. May 6. Vol. 43. No. 18. pp. 298–300. [1 ref.]

[46] Kondo (Shoichi). On the Anti-Rabic Vaccination in the Dog.—*Ann. Rep. Vet. Laboratory, Nishigahara, Tokyo, Japan, for Year 1925.* Appendix pp. 1–4.

[47] Bailly (J.). Pratique de la vaccination antirabique des solipèdes par le virus-éther (méthode de Remlinger).—*Rev. Gén de Méd. Vét.* 1927. May 15. Vol. 36. No. 425. pp. 254–258. [5 refs.]

[48] Crawford (M.). Four Cases of Equine Rabies with Failure to protect with Anti-Rabic Vaccine.—*Vet. Jl.* 1927. Mar. Vol. 83. No. 3. pp. 140–144. [1 ref.]

[49] Bailly (J.). Vaccination antirabique du chien par la méthode de Remlinger. —*C.R. Soc. Biol.* 1926. Dec. 3. Vol. 95. No. 35. pp. 1317–1318. [1 ref.]

[50] Miessner (H.) & Baars (G.). Immunisierung gegen Lyssa der Hunde mit Lyssin.—*Cent. f. Bakt.* 1. Abt. Orig. 1926. Dec. 7. Vol. 101. No. 1/3. pp. 79–108. [Numerous refs.]

[51] Baars (G.). Immunisierung der Hunde gegen Tollwut.—*Deut. Tierärzt. Woch.* 1927. Feb. 12. Vol. 35. No. 7. pp. 99–102. [1 ref.]

**Schnürer** and **David**[52] have conducted a number of experiments on the percutaneous treatment of dogs. Six dogs were treated with a mixture of one part of fresh virus and two parts of saline—and two with Umeno and Doi's vaccine which had been killed by keeping for one month. Two of the first group died otherwise. After 94 days the surviving animals and six controls were tested with street virus administered intramuscularly. None of the immunized developed rabies (6 months), whilst three out of the six controls developed rabies.

**Gerber**[53] points out that the prevalence of rabies in the United States is greater than was supposed. For example in 1921 rabies existed in 29 states, and of 5,558 brains examined, 2,699 gave positive results. Also in 1922 it was estimated that 10,000 persons received antirabic treatment. After a discussion of the various methods of control, he states that in the outbreak of rabies in the Dona Ana county in 1925, at least 50 rabid dogs were at large. Approximately 500 dogs were vaccinated and none of this number developed the disease. He draws attention to **Schoening's** experiments on the plurality of strains of street virus (this *Bulletin*, Vol. 23, p. 197).

**Schern**[54] contributes a general article on the control of canine rabies, pleads for compulsory vaccination of dogs, and suggests a system of organization.

**Mirri**[55] in a general paper describes the various methods of preventive inoculation, and discusses the influence of plurality of strains.

**Mello** and **Poggio**[56] advise the employment of 30–75 gm. of a 10 per cent. brain emulsion in 1 per cent. phenol for the treatment of cattle. The dosage should be distributed over a period of 15 days.

**Finzi**[57] discusses canine vaccination in general, and gives the conclusions of a previous communication (*ante*, p. 227). **Ramos Mejía**[58] discusses measures of prevention of rabies in Buenos Ayres.

## viii. *Miscellaneous.*

**Kawatani**[59] has investigated the effect of various disinfectants applied locally at the site of inoculation. The amount of solution used in each case was 100 cc. and this quantity was applied during a period of two minutes. The fluids tested were 1/30 lime sol suspension, 1/10 lactic acid, and 1/10 glacial acetic acid. The interval between inoculation and washing varied in the different experiments. It was found that with fixed virus it was necessary to apply the disinfectant earlier than with street virus. The most effective disinfectant was lime sol suspension. In one series of 10 rabbits which had been inoculated on the surface of the cornea with street virus, and which had after a period of 6 hours been subjected to lavage with lime sol, there were eight survivors, whereas in a control group of ten rabbits seven developed rabies. The tests were made in most cases on the surface of the cornea.

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[52] **Schnürer** (Josef) & **David** (Hans). Kutane Immunisierung von Hunden gegen Lyssa.—*Berlin. Tierärzt. Woch.* 1927. Apr. 29. Vol. 43. No. 17. pp. 273–274.

[53] **Gerber** (C. W.). The Control of Rabies. *Southwestern Med.* 1926. Nov. Vol. 10. No. 11. pp. 482–485. [5 refs.]

[54] **Schern** (Kurt). Betrachtungen ueber die obligatorische Tollwutimpfung der Hunde.—*Berlin. Tierärzt. Woch.* 1927. Mar. 4. Vol. 43. No. 9. pp. 140–142.

[55] **Mirri** (A.). La profilassi della rabbia e la vaccinazione preventiva dei cani.—*Clin. Vet.* 1927. Feb. Vol. 5. No. 2. pp. 90–93.

[56] **Mello** (Ugo) & **Poggio** (Carlo). La vaccinazione antirabbica dei bovini.—*Ann. d'Igiene.* 1927. Jan. Vol. 37. No. 1. pp. 9–27. [40 refs.]

[57] **Finzi** (Guido). Vaccinazione antirabica dei cani e rabbia da vaccino.—*Clin. Vet.* 1927. May. Year 5. Vol. 50. No. 5. pp. 274–282.

[58] **Ramos Mejía** (C.). Profilaxis de la rabia en la Ciudad de Buenos Aires.—*Semana Méd.* 1927. Feb. 17. Vol. 34. No. 7 (1727). pp. 441–443.

[59] **Kawatani** (Saneto). Experimental Studies on the Prevention of Hydrophobia.—*Kitasato Arch. Experim. Med.* 1926. Dec. Vol. 7. No. 1. pp. 61–93. [43 refs.]

BUSSON[60] continues his interesting observations on cross immunity (*ante*, p. 231) between rabies and variola. He finds from experiments on guineapigs that vaccination with variola during the incubation period of rabies has no effect upon the duration of the incubation period.

TAKAYA'S[61] observations on the destructive action of ultra violet rays on virus in vitro (this *Bulletin*, Vol. 24, p. 222) led him to investigate the effect of applying these rays to the infected animal during the incubation of the disease. This treatment proved ineffective. The development of subordinate dispensaries in the outlying districts forms the subject of a communication by V. PUNTONI.[62] The first dispensary was opened at Suzzara in 1923, and in 1925 nine dispensaries were in operation. In all 1,274 cases have been treated, with two deaths (mortality 0·16 per cent., reduced mortality zero).

Lino PUNTONI[63] in a further communication draws attention to the gravity of bites on the terminal phalanges. He cites five cases which have died in spite of treatment, and advises that such cases should be subjected to an intensive course.

FERMI[64] replies to certain statements by V. PUNTONI.

In conclusion the reviewer would draw the attention of all rabies workers to the monograph on Lyssa by LUBINSKI and PRAUSNITZ. (*Ergebnisse der Hygiene, Bakteriologie Immunitätsforschung und Experimentellen Therapie*: part of Vol. viii, Berlin: Julius Springer: 1926.) In this excellent memoir the subject of rabies is brought up to date. The latest researches are described and discussed. The bibliography which covers 20 pages should prove a useful guide.

A. G. McKendrick.

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[60] BUSSON (B.). Ueber Wechselwirkung von Vakzine und Lyssa bei Meerschweinchen.—*Wien. Klin. Woch.* 1927. Apr. 7. Vol. 40. No. 14. pp. 449–50. [1 ref.]

[61] TAKAYA (K.). Experimentelle Studien ueber die Hundwut. Einfluss und Wert der Ultraviolettenstrahlen auf Hundwutvirus.—*Oriental Jl. Dis. Infants.* 1927. Jan. Vol. 2. No. 1. German summary p. 121. [In Japanese.]

[62] PUNTONI (V.). Il dispensario antirabico. Una nuova istituzione di medicina sociale.—*Policlinico.* Sez. Prat. 1927. Mar. 28. Vol. 34. No. 13. pp. 451–454.

[63] PUNTONI (Lino). La gravità delle morsicature rabiche alla radice ungueale.—*Ann. d'Igiene.* 1927. Apr. Vol. 37. No. 4. pp. 232–235.

[64] FERMI (Cl.). Die antirabische Vakzination und Serovakzination Fermi.—*Seuchenbekämpfung.* 1927. Vol. 4. No. 2. pp. 102–111. [8 refs.]

# REVIEWS AND NOTICES.

COMPTE-RENDU DU PREMIER CONGRÈS INTERNATIONAL DU PALUDISME, ROME, 4, 5, 6 OCTOBRE, 1925. **[Report of the First International Congress on Malaria, Rome, 4, 5, 6 October, 1925.]**—345 pp. With numerous text figs. Publié par le Secrétaire Général du Congrès. 1926. Rome: Imprimerie du Sénat du Dr. J. Bardi. [Lit. 100.]

The final publication of this report places in the hands of those interested a great mass of material. The main portions have nearly all been abstracted in this *Bulletin,* having already been published in various journals, but the whole volume forms an essential part of malarial literature. The scope of matters with which it deals is extraordinarily wide. The unicity or otherwise of malaria parasites, studies on general paralysis, complement in malaria, papers on pathological anatomy, Gambusia, Paris green, the house in malaria, blackwater fever. Regarding mosquitoes the possibility of direct transmission of malaria was considered and was negatived; and the suggestion was made that in parts of Mexico anopheles were too scanty to account for the malaria present. Treatment came in for much consideration, possible synthetic formation of the alkaloids of cinchona being particularly dealt with, as well as the therapeutic value of cinchona alkaloids other than quinine. Apart from this, there are a number of papers in the Appendix which are concerned with a yet wider range of malarial subjects. It is proposed to hold the next Congress in 1930 in Algiers to commemorate the centenary of Algeria and the jubilee of the discovery of the parasite of malaria by LAVERAN in that country.

C. L.

MCDONALD (W. Maclachlan). **Collected Papers on Tropical Diseases.**—48 pp. With 5 photographs. 1926. Antigua: Government Printing Office, Leeward Islands.

Dr. Macdonald has collected in this brochure nine papers, seven of which have been published in medical journals. With the exception of a nineteenth century one on ankylostomiasis in Antigua, they date from 1916, and later, and deal with malaria and anti-mosquito measures, pellagra, pulmonary tuberculosis and dysentery. In " Pulmonary Tuberculosis as a Problem of Tropical Medicine " he points out the ease with which this affection may be mistaken for malaria in the tropics, where low fever and absence of cough may characterize each, and notes that the prognosis of pulmonary tuberculosis correctly treated is " infinitely better " in the West Indies than in England. The Governments in the West Indies should provide special facilities for its diagnosis and treatment. He makes the practical suggestion that experiments be carried out in a defined area for the application of various anti-mosquito measures, believing that the increased efficiency of labour which would result would induce the employers to combine in a comprehensive scheme of mosquito reduction.

Dr. Macdonald is a clear writer and the collection of his papers should serve a useful purpose in Antigua where, one gathers, the planters are not enthusiastic hygienists.

A. G. B.

STRICKLAND (C.) [M.A., B.C. (Cantab.), etc.] & CHOUDHURY (K. L.) [M.B., D.P.H. (Cal.), etc.] **An Illustrated Key to the Identification of the Anopheline Larvae of India, Ceylon and Malaya, West of Wallace's Line with Practical Notes on their Collection.** With a Foreword by Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S.—pp. xi 67. With 12 plates. 1927. Calcutta & Simla; Thacker, Spink & Co. [Rs. 4/8.]

This excellent little book, the doctrine of which is that for the medical man and sanitarian the identification of anopheles larvae in the field is a great economy, contains, besides the means of identifying them, a canon and complete ritual of the science and art of manipulating anopheles larvae both in their native element and in the laboratory—of dealing with them as a part of the ordinary routine of a malaria survey. Here the novice in any part of the world may learn all that is needful in the matter of equipment and its usage for the search and capture of the larvae, and all that is methodical for treating the capture and transforming it into a compact and permanent record afterwards. Some may think, perhaps, that the capture of anopheles larvae is a matter too simple for any elaborate detail of instruction; but the reviewer himself has known a man, who was no mean field naturalist, pronounce a piece of water that was fecund in anopheles to be sterile, because he had not learned exactly where to direct his search for the larvae and how to dip for them. Besides all this comprehensive instruction, which is of general value, there is for workers located in the Orient a series of keys—all of simple construction and plainly illustrated by enlarged drawings—by which the larvae of the species of Anopheles inhabiting India and Ceylon and Malaya can be identified severally.

A. Alcock.

MITCHELL (J. Alexander) [M.B., Ch.B. (Glasg.), D.P.H. (Camb.), Secretary for Public Health & Chief Health Officer for the Union of S. Africa], PIRIE (J. H. Harvey) [B.Sc., M.D. (Edin.), F.R.C.P.E., F.R.S.E., Bacteriologist & Pathologist, Research Division of the Institute] & INGRAM (A.) [M.D. (Edin.), Medical Entomologist to the Institute.] **The Plague Problem in South Africa: Historical, Bacteriological and Entomological Studies.**—*Publications of the S. African Inst. for Med. Res.* 1927. Mar. Vol. 3. No. 20. pp. 85–256. With 1 map, 25 figs. on 11 plates & 2 charts.

The authors of this informative and interesting publication give an account of recent investigations into plague in South Africa, and link them to events in the past in such a way as to present a clear picture of the whole problem. The present pandemic spread from Hong Kong in 1894; India was invaded in August 1896 through the port of Bombay; and on 6th February 1899 plague in the Union was first discovered at Middleburg (Transvaal) in the person of an Indian who had journeyed from Bombay. The docks at Capetown became infected during the early part of the year 1901, and henceforth, till 1914, the outbreaks exhibited the usual features of plague as they appear when brought about and spread by domestic rodents. During this period the infection was shipborne to the ports, and thence railborne to inland localities. The preventive measures adopted gave promise of eradicating the infection, but in August 1914 a new phase of the problem appeared in the pneumonic outbreak on the farm "Fairview," in Cape Colony, about 140 miles from Port Elizabeth. Although the later cases in this district were mostly bubonic, signs of an accompanying rodent infection were not manifest. Scattered outbreaks on farms continued to occur throughout the Union in circumstances which gave no clue to the source of the infection, but in 1920 Mitchell and HAYDON ascertained that the distribution of the outbreaks corresponded roughly with the sandy stretches of veld specially frequented by gerbilles (*Tatera lobengulae*). Evidence of an epizootic in the veld rodents was first obtained at Knysna on the coast of Cape Colony in October 1903, when the striped mice (*Rhabdomys pumilio*) inhabiting the dense woods near the town were shown to be suffering severely from plague. An epizootic of plague among the rats in the town preceded, and indeed was the origin of the outbreak. It is probable that the infection after travelling through the coastal forest belt among the striped mice was passed on by them to the gerbille colonies, and to other associated veld rodents, in the farming country farther inland. In recent years evidence has been accumulating that the epidemiology of human plague here is bound up with the bionomics of the veld rodents and of their carnivore associates—the suricate and yellow mongoose. An epizootic in gerbilles and multimammate mice which was responsible for a fatal case of human plague in February 1921, near Bothaville, furnished the first definite proof incriminating veld rodents. Natural plague has since been found in 11 species of veld rodents and in the yellow mongoose.

The gerbille and the multimammate mouse are the important species for the spread and persistence of plague on the High Veld, with the ground squirrel and, perhaps, the spring hare playing subsidiary parts. In the ower and more bushy country the striped mouse is probably the chief agent; in the Karroo districts the Namaqua gerbille and the Karroo rats are perhaps the main propagators, with hares playing a minor part. Most of the 20 species tested by experiment proved to be acutely susceptible to plague, the exceptions being the Namaqua gerbille and the yellow mongoose. The suggestion is made in the Report that this animal and the suricate, both of them carnivorous species, deserve to be protected rather than destroyed. The cannibalistic habits of the gerbille in nature during a plague epizootic, and the fact that it is readily infected under experimental conditions by feeding, indicate that this mode of transmission may prove to be of considerable importance ; but if this is so the relative importance of infection *per os* as compared with flea transmission cannot be determined until a larger number of spontaneously infected animals have been collected and examined. The evidence obtained so far points to the predominating role of the flea as the transmitting agent in the rodent epizootics. For the persistence of plague in the rodent reservoir the flea is all-important, and experiments that were carried out in rodent-proof and flea-proof runs on the veld, with gerbilles as the experimental animal, showed that in the absence of fleas plague did not persist in the burrows even for one month ; and that when fleas were present the infection persisted abundantly for two months, and to some extent even for three months. These results are certainly significant in explaining how plague may be carried over from one summer to another and over periods when the rodent population is scanty. Four of the species of fleas that infest the wild rodents can imbibe human blood, namely, *Dinopsyllus lypusus* J. and R., *Xenopsylla eridos* Rothsc., *Xenopsylla erilli* Rothsc., and *Chiastopsylla rossi* Watrst., as can also *Xenopsylla brasiliensis* Baker, a parasite of the house-rat. Excepting *Xenopsylla erilli*, these species can apparently transmit plague amongst rodents.

From the year of its introduction in 1899 to 30th June 1926 there have been 2,568 plague cases with 1,505 deaths in South Africa. The area of infected country is now estimated at 100,000 square miles. For the year ending 30th June, 1924, there were 372 cases (235 deaths) in the Union ; all except 6 occurred on farms, and native herdboys were mostly attacked. In the majority of instances the infection was derived from veld rodents with fleas as the intermediary, and in this connexion it is worth noting that since 1912 there has been practically no plague in domestic rodents in South Africa. About 12 per cent. of the cases in the year ending June 1924 were of the pneumonic type; their origin was usually a bubonic case with a lung complication ; infection in many seems to have been conveyed by kissing.

The following conclusions, amongst others, drawn from work on plague vaccines and sera, may be mentioned here :—

(1) Cutivaccination by Besredka's method with a formalin-killed emulsion of plague bacilli has no prophylactic value in gerbilles and multimammate mice.

(2) Sensitized vaccines are of little use for prophylaxis and treatment of plague infection in gerbilles.

(3) Vaccination with a living avirulent culture gives a higher degree of immunity in gerbilles than a killed vaccine.

(4) Antiplague serum gives very good results in the treatment of plague in guineapigs when administered early and in large doses ; the life of the highly susceptible gerbille is prolonged by the use of serum but no actual cures resulted.

(5) Mercurochrome is useless in the treatment of plague in guineapigs.

Attempts were made to discover whether strains of the *B. pestis* from different sources fall into serological groups, but the work done so far does not permit of a final conclusion. There appears to be no essential difference between the South African strains, both human and rodent, and " foreign " strains.

One of the sections of the report deals with a new disease of veld rodents—Tiger River disease. The causative organism was isolated by Dr. J. H. Harvey Pirie and is probably identical with *B. monocytogenes* of E. G. D. MURRAY and his colleagues.*

Included in the report is a table which shows clearly the outbreaks, cases and deaths that have occurred from 1899 to 30th June, 1926, and a map in which the infected and hitherto non-infected areas are shown by means of colours. With the aid of this table and map the main epidemiological data relating to plague in South Africa can be readily understood.

G. F. Petrie.

PINEY (A.). [M.D., Ch.B. (Birm.) ; M.R.C.P. (Lond.), Research Pathologist, Cancer Hospital, London, etc.] **Recent Advances in Haematology.**—pp. viii+276. With 18 text figs. & 4 coloured plates. 1927. London : J. & A. Churchill, 7, Great Marlborough Street. [12s. 6d.]

To write a review of this book is no easy task. It contains much that is of value and the illustrations are excellent. A good deal of technical knowledge is required to appreciate the book and it is not adapted to the needs of the novice. The author has original views on many questions in haematology and evidently the more heterodox and bizarre theories in the literature appeal to him more than those commonly accepted. The expert will find in these pages much to interest him and much to irritate. The author justifiably complains of the difficult style of the late Arthur PAPPENHEIM and of GRUNER, but he loses the lesson conveyed by a parable about a mote and a beam. We cannot follow him in many of his arguments. Thus (p. 77), " the most immature normoblasts have basophilic (immature) cytoplasm, whereas some megaloblasts have eosinophilic (mature) cytoplasm ; it is clearly impossible that a more mature cell can be the immediate ancestor of a less differentiated one." The proposition might be logical if *all* megaloblasts had mature cytoplasm, but is it not possible for a beardless suckling to have a hirsute sire ? We find no reference to the work of MUIR, Noel PATON and GULLAND and a reviewer North of the Tweed may be forgiven a cynical smile in noting that no good thing can come out of Scotland except McGOWAN's poultry.

Alexander Goodall.

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*MURRAY, E. G. D., WEBB, R. A. & SWANN, M. B. R. A Disease of Rabbits characterised by a Large Mononuclear Leucocytosis, caused by a Hitherto Undescribed Bacillus *Bacterium monocytogenes* (n. sp.).—*Jl. Path. & Bact.* 1926. Vol. 29. pp. 407–439.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

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## AMOEBIASIS AND DYSENTERY.

### AMOEBIASIS.

MANSON-BAHR (Philip). **Recent Experiences in the Diagnosis of Liver Abscess. (From an Analysis of 40 Cases.)**—*Kenya & East African Med. Jl.* 1927. Apr. Vol. 4. No. 1. pp. 2–16. With 3 figs. [1 ref.]

——. **Practical Experiences in the Diagnosis of Liver Abscess.**—*Jl. Trop. Med. & Hyg.* 1927. Apr. 16. Vol. 30. No. 8. pp. 106–108.

The illustrious Patrick MANSON taught that the secret of success in the diagnosis of liver abscess was always to think of it. Although a "classical" case of tropical liver abscess, so well described in the text books, presents no difficulty in diagnosis, yet, the author points out, variations from the type picture are frequent in practice, and may be of such a degree as to make diagnosis very difficult. But accurate and early diagnosis is of great importance to the patient. In these two papers Dr. Manson-Bahr has fully and clearly described and discussed the variations in clinical signs, and absence of signs, of liver abscess in a recent series of 40 cases occurring in his own practice. We can give but a brief summary of the main points described by the author. 38 were men; 2 women: 37 right lobe; 3 left lobe. In these 40 cases repeated microscopic examination of faeces revealed cysts of *Entamoeba histolytica* in 57 per cent. History of previous dysentery, or intestinal disturbance, or intermittent diarrhoea, was given by most of the patients, but in 14 cases no such history was obtainable. Typically, onset is insidious; but in 3 cases it was sudden, with rigors simulating malaria. In 2 cases toxaemia was so profound that a diagnosis of enteric fever had been made. A peculiar earthy tinted facies, with emaciation, is almost pathognomonic; however, in 3 cases the patient's normal rubicund countenance persisted. Emaciation may be extreme enough to suggest malignant disease, or there may be no loss of weight. In 3 cases abscess of liver was present at the same time as the passing of bloody mucous stools containing *E. histolytica*. In 2 cases in which abscess burst through diaphragm into bronchus, there was melaena—typical black tarry stools. Although pyrexia is usual, in 2 cases there was none; exploratory aspiration alone can settle diagnosis in these latter. Night sweats very often accompany pus in liver; yet in the more chronic form

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of abscess they may not be noticeable. In the hepatic area, pain is not so frequent as is a sense of weight or uneasiness; thus the shoulder may droop on the affected side. Pain may be felt by the patient only on direct pressure on, or forcible percussion over, the anterior surface of the liver itself. Pain is common in the acute, rarer in the chronic, abscess.

Pain referred to the shoulder joint is the most striking and characteristic symptom; it is searching in character and intensified by warmth—as in bed. It usually radiates over the right shoulder; liver abscess is usually in the right hepatic lobe; but in 3 cases of left lobe abscess there was left shoulder pain. This shoulder pain is the outstanding symptom of liver abscess; its significance should never be forgotten. It may be quite transient and so must be enquired about. In one case the shoulder was thought to have been accidentally bruised and not till months later was the liver abscess discovered. Intrathoracic distress may be set up by pressure, and the heart may be displaced by large effusions. Intra-abdominal pressure may produce gastric or duodenal irritation and, if emaciation be present, dyspeptic symptoms may suggest malignant disease. With moderate sized abscesses increase of liver dullness is downwards. If the abscess lie in the upper and posterior portion of right lobe exerting pressure on diaphragm, then liver dullness is increased upwards and the heart may be displaced. One case showed no appreciable enlargement of liver, yet yielded by aspiration 25 oz. of liver pus. Pulmonary signs associated with liver abscess consist in, at first, impairment of percussion note, later signs of pneumonic consolidation, or pleural effusion. Local oedema of chest wall was present in 4—all acute cases. The site of oedema indicates direction in which the abscess is pointing. In hepatic amoebiasis, intestinal ulceration is usually situated in the caecum: sigmoidoscopy therefore reveals as a rule little evidence of ulceration. Abdominal palpation may discover thickening of bowel in the right iliac fossa; it is rare to find corresponding involvement of sigmoid flexure. From 10 to 35 thousand leucocytes per cmm. were present in 82·5 per cent. of the cases. In 7 cases there was no increase of leucocytes. By X-ray screening, doming, fixation, or diminished movement of diaphragm on affected side may be noted; but in only 7 of the 40 cases was efficient aid in diagnosis given by X-ray. In one case there was definite enlargement of the supraclavicular glands on both sides, associated with abscess in the left hepatic lobe.

*Aspiration.*—The characteristic chocolate-coloured pus is quite enough to establish diagnosis of amoebic abscess. In old cases the pus is thicker, of gummatous consistency and yellow. Amoebae can rarely be demonstrated in the aspirated pus. The author was able to find them in 2 cases only. Their absence—in old chronic abscesses they have died out—does not negative diagnosis of amoebic abscess. The microscopic appearance of the pus is sufficiently diagnostic. The pus cells are much disintegrated and contain many iodophilic granules. A serous effusion may be obtained (2 cases) from pleural cavity; the fluid is highly albuminous and coagulates almost spontaneously. It is sterile on culture and contains large numbers of polymorphonuclear cells. In a suspected case presence of serous fluid is confirmatory evidence of liver abscess.

*Rupture of abscess*—into lung with evacuation of pus through bronchus occurred in 7 cases. Such rupture is generally sudden; its dramatic course may give rise to difficulty in diagnosis; 3 cases had been treated for varying lengths of time for pulmonary tuberculosis. In one case, rupture of abscess into lung occurred without there having been any previous signs of liver involvement. The rupture was preceded by uncontrollable hiccough.

H. M. Hanschell.

SEGURA (Gerardo). Consideraciones sobre el absceso hepático. [**Hepatic Abscess.**]—*Semana Méd.* 1927. Mar. 31. Vol. 34. No. 13 (1733). pp. 799–804.

The author describes a case of hepatic abscess which at one time had discharged into the lung and had apparently cleared up in 25 days. After an interval of two years a further abscess formed. A second case is recorded in which the patient exhibited signs and symptoms pointing to hepatitis, but no pus was found on exploratory puncture. Examination of some blood withdrawn did not reveal amoebae or their cysts [!], but the patient recovered after a course of emetine. He concludes that the intermittency of hepatitis may be due to the relative paucity of the organisms which enter from the intestine and may thus lie latent for some time ; that chocolate-coloured pus is not necessarily indicative of amoebic infection, being due merely to the presence of necrotic liver tissue ; that " presuppurative hepatitis " is not a good term, but that " diffuse partial suppurative hepatitis " is better, since the condition is characterized by fever and diffuse pain, and smears from puncture show small agglomerations of pus cells without the actual formation of an abscess. [The first two, at least, are points with which most people will be ready to agree.]

H. Harold Scott.

SITSEN (A. E.). Die Komplikationen der Darmamöbiasis und deren Ursachen. [**The Complications of Amoebiasis of the Gut and their Origin.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Mar. Vol. 31. No. 3. pp. 101–113. [27 refs.]

An interesting and valuable paper in which the various lesions demonstrated at autopsy are marshalled for examination and their significance discussed very fully. An abstract can but indicate the general scope. The material examined is gleaned from over 3,400 autopsies, mostly on Malays, carried out since 1913, at Soerabaja, Java. In 221 cases of demonstrable amoebiasis of gut many suffered from diseases other than dysentery. In 69 with obvious dysentery, this was probably not the sole cause of death, for all were helminth carriers, especially of ancylostome, ascaris and trichocephalus; all had malaria and many some degree of beriberi. In 99 of the cases there were also present other diseases, e.g. pneumococcal, tubercle, leprosy and typhoid.

In one group besides dysentery, extension of the inflammation through the gut wall had set up peritonitis with adhesions, pararectal abscess and recto-vaginal fistula, [but para-and peri-metritis is common in the women—sequelae of genital, especially gonococcal, infection]. Perforation of ulcer and acute peritonitis were found also.

*Liver abscess.* 22 cases—14 in right lobe, 4 in left lobe, in 3 site not recorded, in one case in both lobes. In 15 abscess was single, in particular cases 2, 3, 4 and 8 abscesses were found, in 2 they were "very numerous." In one, abscess had ruptured into peritoneum, and in 3 cases directly through diaphragm into chest. In the 221 cases of gut amoebiasis no cases were found of thrombosis of vena hepatica, inferior vena cava, or of branches of portal vein, without hepatic abscess and caused certainly by amoebae. (However, the author had recorded a case in Batavia, in which a partly organized thrombus completely blocked the portal vein, the walls of which were much thickened and infiltrated with amoebae. The liver was atrophied.) Some cases showed scarring, denoting former rupture through peritoneal covering of transverse colon.

*Lung abscess* was found in 2 cases—in one by direct extension rupture from liver through diaphragm ; in the other an abscess in right lung was present with 8 abscesses in liver. The author sets out the data in favour of embolus and direct extension from liver respectively, to account for lung abscess. He doubts if amoebic bronchitis is yet a proved entity.

*Pericarditis*—one case. Inflammation had extended through diaphragm into pericardium, without perforation, from an abscess in right hepatic lobe.

*Cerebral abscess* was not found. (The author had seen one such case in Batavia.) Its occurrence and mode of origin is discussed—probably by embolism from liver abscess.

*Splenic abscess*—in five cases splenic infarction was found, but three of the patients suffered from croupous pneumonia and one from fibrinous pleurisy. The infarction is not, therefore, clearly connected with the amoebiasis.

*Urogenital system*—abscess of kidney was found in one case ; gram negative bacteria were found in the abscess. The author notes and discusses (but does not accept all as satisfactorily proven) the reports of amoebic infection of urinary bladder and also joints.

The paper closes with a careful discussion of the manner and route by which amoebae travel from gut to other organs. Clinical and morbid-histological data are cited : a résumé is given of the course of the lymph vessels of gut, mesentery, stomach, spleen and liver ; it appears that there is no direct lymph connexion between gut and liver. However, the portal vein and its radicals, like other blood vessels, possess accompanying lymph channels—ready avenues which demonstrably are used by the amoebae. The author concludes that the evidence is in favour of lymph vessels as well as blood vessels being the channels along which the amoebae travel.

H. M. H.

GERBASI (Michele). Contributo alla conoscenza della dissenteria amebica nei bambini. [**Amoebic Dysentery in Children.**]—*Pediatria.* 1927. July 1. Vol. 35. No. 13. pp. 689–702. [12 refs.] [Univ. Palermo.]

The author gives brief records of 30 cases of amoebic dysentery among children. Nineteen were under the age of 2 years, and in some the disease was exceptionally severe, as many as 60 evacuations occurring in 24 hours. Most of them came from Palermo, where the disease appears definitely to be endemic. Seven terminated fatally, ten were taken away by their parents before the course was completed, and could not be followed up ; thirteen were cured. Emetine was used in all cases, the dose varying usually from 0·25 to 2 cgm.

The cases are divided into two categories on a clinical basis (1) Those with sudden onset and running an acute course, in whom, if emetine treatment is not promptly taken in hand, death occurs in a few days; 21 of the 30 were of this type. (2) More chronic cases; less common, only 9 amongst the 30 recorded. They suffer from chronic diarrhoea, are often afebrile and rapidly emaciate, and may die from the dysentery or from some intercurrent disease.

H. Harold Scott.

VIALARD & DARLÉGUY. Sur quelques cas de pleurésie diaphragmatique droite primitive avec syndrome hépatique chez des malades coloniaux dysentériques amibiens. [**Primary Right Diaphragmatic Pleurisy in Patients who have had Amoebiasis.**]—*Arch. Méd. et Pharm. Nav.* 1927. Jan.-Feb.-Mar. Vol. 117. No. 1. pp. 5–29. [31 refs.]

An interesting paper in which is discussed very fully, with reference to illustrative cases which are in turn described, the very difficult matter (for the clinician) of the differential diagnosis of primary diaphragmatic pleurisy of the right side, in patients from the tropics who have suffered from amoebiasis. A summary of the paper is not possible. The authors bring out clearly that hepatitis and primary diaphragmatic pleurisy give identical clinical signs in all their variety, including that of temperature and the shoulder pain. They have found some important help from blood counts. For example, tuberculous pleurisy gives a decrease in polynuclears and an increase of lymphocytes and large mononuclears. Abscess of liver gives a definite polynuclear increase. Except in clear cases of effusion, purulent or otherwise, they are against exploratory puncture: one may thereby infect the liver with, for example, Koch's bacillus, if the needle passes through the pleura.

They urge the value of the therapeutic test. Treatment by emetine, stovarsol, treparsol, and the arsenobenzols can do no harm to a case of primary pleurisy; while if the condition be due to amoebiasis, treatment while clearing up the condition will make clear the diagnosis.

H. M. H.

BALDWIN (A. H.), HEYDON (G. M.) & BROBEN (J. A.). **Amoebic Dysentery acquired in North Queensland.**—*Med. Jl. Australia.* 1927. Mar. 12. 14th Year. Vol. 1. No. 11. pp. 374–375.

The authors state that although a certain number of well authenticated cases of amoebic dysentery acquired in Australia have been reported, fresh ones are always of interest. The present paper describes one case, and mentions a possible second case. Neither patient had ever been out of Australia. Examination of stools in the first case revealed *E. histolytica*, and many red blood cells, eosinophile cells, epithelial cells, Charcot Leyden crystals and many bacteria. The first treatment, before demonstration of amoebae, had been by polyvalent anti-dysenteric serum. It was unsuccessful. Eventually treatment by emetine-bismuth-iodide restored the patient to health with normal stools free from amoebae.

H. M. H.

KAPLAN (Bertha), WILLIAMSON (Charles S.) & GEIGER (J. C.). **Amebic Dysentery in Chicago: Preliminary Report of a Survey of Food Handlers following a Small Outbreak.**—*Jl. Amer. Med. Assoc.* 1927. Mar. 26. Vol. 88. No. 13. pp. 977–980. [3 refs.]

The occurrence within a short period of time of cases of amoebic dysentery in a large public hotel in Chicago led to the examination of 720 food-handlers.

| Protozoa. | Cases. | Percentage. |
|---|---|---|
| *E. coli* ... ... ... ... ... ... | 125 | 17·36 |
| *E. histolytica* ... ... ... ... ... | 16 | 2·22 |
| *Endolimax nana* ... ... ... ... | 10 | 1·39 |
| *Iodamoeba bütschlii* ... ... ... ... | 30 | 4·17 |
| *Giardia intestinalis* ... ... ... ... | 38 | 5·28 |
| *Trichomonas intestinalis* ... ... ... | 8 | 1·11 |
| *Chilomastix mesnili* ... ... ... ... | 9 | 1·25 |

Metazoan infections were as follows: five showed ova of *Trichuris trichiura*, two ova and segments of *Taenia saginata*, three (one Mexican and two Filipinos) ova of *Necator americanus*, one ova of *Ascaris lumbricoides*, and one of *Strongyloides stercoralis*. The incidence of carriers of amoebic dysentery in Chicago, other than food handlers, is being investigated.

H. M. H.

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PICKARD (Rawson J.). **The Pathogenicity of the Small Races of the "Ameba of Dysentery."**—*Jl. Lab. & Clin. Med.* 1927. May. Vol. 12. No. 8. pp. 743–755. [19 refs.]

The author very interestingly and fully discusses the subject of his paper. His own summary of it is:—

"1. There is evidence that the intestinal protozoa cannot be beneficial to man, only negative evidence that they are ever innocuous, and positive evidence that they can be dangerous; theoretically any of them might become pathogenic. The danger of an infection may be shown either by time of observation in the individual, or by the percentage of disease in a number of infections.

'2. *Entamoeba histolytica* presents two types: a race with large cysts usually associated with amoebic dysentery of tropical origin, and a race with small cysts that is common everywhere, rarely associated with dysentery, but apparently the cause of low grade illnesses in midlife. The most complete proof of the etiologic relationship of the amoeba to this pathogenicity has been given by KOFOID and his followers.

"3. BRUMPT thinks the small race differentiated enough to be considered a separate species, *E. dispar*.

"4. The question of mutability or immutability of the size races of *E. histolytica* awaits perfection of culture methods and media, its growth in pure culture free from bacteria, preferably with living tissue cells to approximate natural conditions. Study could then be made of the histolytic enzyme or other products. Surveys of different age-groups would show at what time of life amoebic infection begins.

"5. The effect of tropical climate on man and its possible reaction upon his parasites, suggested by HAUGHWOUT, is important. RODDIS and COOPER have shown a definite harm from tropical climate, lowered basal metabolism, blood pressure, suggesting the possibility of other variations."

H. M. H.

YORKE (Warrington) & ADAMS (A. R. D.). **Observations on** *Entamoeba histolytica*. **III. Some Factors governing Development and Excystation of the Cysts** *in Vitro.—Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 281-292. [4 refs.]

The authors have shown (1926) that cysts of *Entamoeba histolytica* readily develop and excyst under suitable conditions *in vitro*. They pointed out that moisture and temperature about 37° C. were essential for excystation (*ante*, p. 15). Later (1926) DOBELL and LAIDLAW reported successful culture from *E. histolytica* cysts which had appeared from time to time in their culture tubes, and also from cysts passed in faeces. They stated that "cysts just passed in the stools do not hatch or develop further if placed immediately in culture-media and incubated at 37° C.: they merely die. They must first be allowed to cool, and must then be kept for a certain time"—about one or two days. Important epidemiological questions now arise: the faeces of chronic dysenterics are then not infective for one or two days after being voided?

Yorke and Adams had the contrary impression; although they had not specially investigated this point, they had amongst their protocols many records of successful initiation of culture from *E. histolytica* cysts passed only three or four hours. To reinvestigate the subject, patients suffering from chronic amoebic dysentery were brought to the laboratory where they evacuated the bowel; so that freshly-passed stools could be sown immediately in warm Locke-egg-serum medium (BOECK 1924; BOECK and DRBOHLAV 1925). A differential count in iodine of the various cysts and vegetative amoebae (i.e., as regards the number of nuclei they contained) was made immediately on passage of the faeces, and also after its cultivation on L.E.S. medium for five hours. The technique of the experiments is described. The observations are discussed, and the results, presented in tabular form, are analysed.

The authors' summary of their work is :—

"1. We have been unable to confirm the recent statement by Dobell and Laidlaw that before the cysts of *Entamoeba histolytica* can hatch or develop further, they must first be allowed to cool for a period of one or two days in order that 'maturation' may occur.

"2. Immature cysts (i.e., uni- and bi-nucleates) just passed in stools develop further if placed immediately on culture-media and incubated at 37° C., so that within a few hours the great majority of the cysts have become quadrinucleate.

"3. Cooling immature cysts to from 0° to 5° C. for periods up to 48 hours does not destroy them or interfere with their capacity to develop and excyst.

"4. The degree of excystation resulting from sowing freshly-passed faeces on L.E.S. medium, and incubating at 37° C., is very variable; it may be nil, and it rarely exceeds 50 per cent. This relatively poor excystation cannot, however, be explained on the hypothesis that the cysts require to undergo maturation outside the body at low temperatures, because cultures of washed concentrated cyst-suspensions, prepared at 37° C. from the freshly-passed faeces, invariably yield a much higher degree of excystation, frequently approaching 80 to 90 per cent.

"5. There appears to be no reason to doubt that in some stools an appreciable proportion of the cysts are dead at the time of passage, but in other cases the percentage must be practically negligible.

"6. Evidence has been adduced that freshly-passed faeces contains something which inhibits excystation."

H. M. H.

DOPTER (C. A. H.). L'amibiase pulmonaire. **[Pulmonary Amoebiasis.]** —*Arch. Méd. et Pharm. Milit.* 1927. Apr. Vol. 86. No. 4. pp. 269–284.

An interesting and full review of the subject. Only some indication of its scope can be given. Abscess of the liver extending through diaphragm into lung, and rupturing into a bronchus ; and abscess of lung separated from, yet once connected with a co-existing abscess of liver, are well known. Besides these forms of pulmonary amoebiasis there exists :—

1. The *primary amoebic abscess of lung*, having no connexion with abscess of liver, which organ is unaffected. In most, but not all cases of primary amoebic lung abscess there can be obtained a history of former dysentery or diarrhoea. Primary abscess of lung is usually single, but close around the obvious single larger abscess are often satellite smaller ones which eventually coalesce with the central larger one. Multiple primary abscess of the lung has been recorded. The primary abscess has been recorded more often in the right than in the left lung. Its size may reach that of a foetal head. The author describes its macroscopic and microscopic anatomy, discusses lucidly the often very difficult differential diagnosis, and stresses the point that if amoebae are not found in the sputa diagnosis may be settled by noting the effect of emetine treatment. For though emetine by its vaso-constrictor action cures haemoptysis, it does not cure pulmonary tuberculosis, which will progress in spite of its administration ; but emetine will cure pulmonary amoebiasis. He discusses the matter of surgical intervention ; in those cases where free drainage through a bronchus has not been established and where the abscess is too large for absorption surgical measures are necessary.

2. *Amoebic bronchitis.* The author doubts if this be a proved entity yet ; he recounts the evidence in its favour brought forward by PETZETAKIS ; and Mme. PANAYOTATOU, who indeed claims priority in this matter, and some others ; but he notes that many observers on the look-out for it in countries where amoebiasis is frequent and well-known have failed to confirm the existence of amoebic bronchitis. He describes its symptomatology—that of ordinary bronchitis—and its cure by emetine therapy. Mme. PANAYOTATOU has described a case of amoebic dysentery in a girl, and later amoebic bronchitis of the girl's father apparently infected by the daughter. The author notes that given the reality of amoebic bronchitis then this in turn may infect others and cause amoebic dysentery.

H. M. H.

TESTOLIN (C.) & BARRALT (R.). Absceso de pulmón de origen amebiano. **[Amoebic Abscess of the Lung.]**—*Semana Méd.* 1927. June 9. Vol. 34. No. 23 (1743). pp. 1392–1393.

The patient, a man of 74, had an attack of dysentery lasting for three days some 3–4 months before coming under the authors' care as a case of broncho-pneumonia. Localized signs in the left lung were ascribed to a loculated interlobar empyema. Operation revealed an abscess containing creamy pus and material from its wall showed living amoebae with the characters of *E. histolytica*. There was no affection of the liver. Emetine was given, 4 cgm. daily for six days, and recovery was uneventful. The case is recorded on account of the rarity of involvement of the left lung and the fact that the abscess was not secondary to amoebic hepatitis.

H. Harold Scott.

BONORINO UDAONDO (C.) & CENTENO (Angel M.). Sobre un caso de amebiasis bronco-pulmonar. [**Broncho-Pulmonary Amoebiasis.**]—*Prensa Méd. Argentina.* 1927. Apr. 10. Vol. 13. No. 31. pp. 1029–1032. With 2 text figs. [1 ref.]

A man of 38 years was admitted to hospital with a history of troublesome cough and copious blood-stained expectoration, for the preceding 15 days. Tuberculosis was suspected, but no bacilli found. Ten months previously he had suffered with abdominal pain and diarrhoea, seven or eight stools daily containing blood. The physical signs were those of bronchitis and localized broncho-pneumonia. No amoebae were found in the stools or in the sputum. The signs all cleared up in 20 days after a course of emetine injections. Diagnosis was made on the results of the treatment.

H. Harold Scott.

PEYRE (E. L.). Fistule entéro-pulmonaire d'origine amibienne. [**Entero-pulmonary Fistula of Amoebic Origin.**]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 213–215.

The patient was invalided from Cambodia where he had suffered from dysentery. Emaciation. No amoebae or cysts found in stools. Resection of left rib for purulent effusion. *Necropsy* revealed—liver (2,250 gm.) enlargement of left lobe. The convexity presented 7 small abscesses, the pus from which contained numerous motile amoebae. The transverse colon at splenic flexure was fixed by a mass of adhesions to the diaphragm. The adhesions enclosed a fistula between diaphragm and colon, leading to pulmonary abscess. The colon itself in the neighbourhood showed typical amoebic ulceration.

H. M. H.

LIPSCOMB (H. R.). **An Interesting Case of Amebic Abscess of the Liver with Rupture into the Lung.**—*U.S. Veterans' Bureau Med. Bull.* 1927. May. Vol. 3. No. 5. pp. 468–471. With 4 plates.

The patient suffered from cough, bloody sputum, fever, pain in right chest, loss of weight. When first seen the impressions in order of probability were: (1) Abscess of right lung, probably amoebic; (2) cyst; (3) tumour; (4) syphilis. A full account is given of the case. The Wassermann proved negative. Diagnosis was difficult on account of length of time which elapsed between attacks; density of tissue which did not resemble abscess; absence of amoebae in faeces and sputum. The final diagnosis, however, was amoebic abscess of liver and right lung. The abscess wall was very thick and dense; it was rapidly and completely absorbed after potassium iodide and diathermy followed by a second course of emetine.

H. M. H.

HALLÉ (Jean) & MOLLARET (P.). Abcès dysentérique du foie ouvert dans les bronches au cours d'un traitement par l'émétine. Guérison. [**Amoebic Abscess of Liver opening into Bronchi in the Course of Emetine Treatment.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Apr. 14. Year 43. 3rd Ser. Vol. 51. No. 13. pp. 508–510.

The patient, a man of 28, who had suffered from amoebic dysentery six years previously in Morocco, was treated by emetine injections; since then he had noticed no return of dysentery. He complained of pain at base of right lung. No fever. X-rays revealed a very large right lobe of liver with immobility of right diaphragm. No amoebae or cysts were found in the stools. Hepatic abscess was diagnosed and emetine injections begun. Next day patient coughed up brownish purulent sputum. Emetine injections continued and liver diminished in size. On 18th day patient coughed up very large quantities of chocolate pus and his temperature became febrile. This continued for four days, after which purulent expectoration decreased. Arsenobenzol injections were given now daily for six days, and then emetine injections resumed. The patient made an apparently complete recovery. The author remarks on this illustration of the efficacy of emetine, and also on the lesser gravity of rupture of amoebic abscess into bronchus as compared with the very grave results of rupture of hydatid cyst into bronchus.

H. M. H.

MESLAY & COCHEZ. Un cas d'amibiase hépatique autochtone. [**Indigenous Case of Amoebiasis of the Liver.**]—*Rev. Méd. et Hyg. Trop.* 1927. May-June. Vol. 19. No. 3. pp. 77–81. With 4 charts in text.

An interesting and lucid account of a type of case, which though familiar to "tropical" practitioners, is still (so the authors state) too often unrecognized for its true nature, in France.

A man 36 years old: five months' loss of weight, and persistent fever. Examination of lungs revealed nothing definite. Serum tests negative. Blood counts revealed polynuclear leucocytosis. No parasites found in blood films. No Koch's bacilli in sputa. X-ray showed relative raising and impaired motility of right diaphragm. Some pain in right hypochondrium. Apparent recovery after a fortnight's open air, and nourishing diet; followed by return of fever, sweats and now more severe right hypochondrial pain, with cough, on resuming work. At this point the patient came under the authors' care. He was found to have pale earthy tinted skin, was wasted, complaining much of right hypochondrial pain—this region was tender to percussion. Liver was enlarged and tender—it measured 24 cm. in the nipple line. Some diminution of percussion note and breath sounds, with pleural friction, at right pulmonary base. Intermittent fever and night sweats. Palpable spleen. No glycosuria or albuminuria. Heart normal. Blood count gave 19,000 whites, with 85 per cent. polynuclears. Stools revealed amoebae.

The patient's history showed that he had not been out of France except for a three weeks' sojourn in Tunis seven years previously. He denied any dysentery. Eight years previously (1916) he had been invalided from the Verdun front for enteritis. The patient was treated by emetine injections and later by "novar" injections in addition. At once there ensued rapid disappearance of fever, decrease in size of liver, and restoration to good health. When examined 3½ years later he was found to be in perfect health.

The authors discuss this case and conclude that the data support a diagnosis of liver abscess. They translate, yet echo, Patrick MANSON's adage on the matter of amoebic infection of the liver—" le grand secret d'un diagnostic heureux est surtout d'y penser."

H. M. H.

BHATTACHARYA (Amulya Kumar). **A Case of Liver Abscess.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 261–262.

A male patient, age 50 years, had suffered from pain and swelling in hepatic region for one year. No history of dysentery or venereal disease. In November, 1925, he received "a course" [actual amount not stated] of emetine injections with much benefit, but discontinued treatment too soon. In August, 1926, he was found to be emaciated; fever 100° to 102° F.; hepatic area tender, and dull to four fingers breadth below costal margin. Liver abscess was diagnosed. The patient was given one grain of emetine intramuscularly for nine days. Temperature became intermittent, but no other change. Aspiration then drew off 550 cc. of pus and six more daily injections of emetine were given. Abscess cavity refilled and 17 days after first aspiration a further 33 cc. of pus were withdrawn and cavity irrigated with quinine solution. Patient's condition worsened and 11 days after second aspiration open operation was performed and drainage tube inserted. Uneventful recovery followed.

The author remarks on the failure of emetine in this case—and opines that emetine alone is only of use when the abscess is a small one.

H. M. H.

PETRIDIS (Pavlos). Traitement de l'abcès tropical du foie. [**Treatment of Hepatic Abscess.**]—*Bruxelles-Méd.* 1927. May 8. Vol. 7. No. 28. pp. 883–903. With 1 chart & 5 text figs.

In this interesting and valuable paper the subject is very fully discussed. We can but indicate its general scope. In 1912 Leonard ROGERS published the result of his research on emetine and its action in amoebiasis. It completely transformed the treatment of liver abscess: for by means of emetine dysentery is more successfully treated, and in consequence, there has been a very great reduction in hepatitis and liver abscess: once hepatitis is set up, emetine disengorges the liver and prevents suppuration: if abscess be formed emetine promotes its absorption, either by itself alone or aided by puncture or other surgical intervention.

Before 1912 there was no other means of treating liver abscess than by open surgical operation. Since 1912 the choice lies between :—

(1) Purely medical treatment with emetine—perhaps associated with other drugs.

(2) Puncture-aspiration, with or without drainage, and in addition emetine treatment.

(3) Open surgical operation, and in addition emetine treatment.

Thus, some form of emetine therapy is obligatory in all cases and in addition to any method of surgical intervention. Each of these three lines of treatment, indications for its adoption, and its technique, are described and discussed fully. The author gives warning that repeated exploratory punctures have sometimes proved fatal, and sometimes failed to disclose a collection of pus present all the time. Puncture aspiration plus emetine treatment is the therapy most often adopted. For those rare cases in which it is necessary, an open operation (that of Aristide PETRIDIS) is described and illustrated—it involves resection of 7th, 8th, 9th, and even if need be 10th ribs; the incised edges of skin, pleura, diaphragm are sutured together, and the liver then incised, pus evacuated, drained, and emetine given to the patient before and after operation.

H. M. H.

IZAR (Guido). Sindrome di anemia perniciosa in amebiasi cronica. [**Pernicious Anaemia in Chronic Amoebiasis.**]—*Riforma Med.* 1927. Apr. 25. Vol. 43. No. 17. pp. 385–387. [3 refs.]

This is apparently a verbatim report of a clinical lecture on a case of severe anaemia. Omitting irrelevant matter, the blood examination revealed erythrocytes 1 million, haemoglobin 30 per cent. No cause could be found and the diagnosis of " idiopathic " anaemia was made. Examination of the faeces was negative on three occasions, but after enemata some sparse vegetative forms of *E. histolytica* and many precystic forms were detected.

Treatment with injections of emetine hydrochloride, 3 cgm. daily, was begun and in twelve days the red cells had increased to 2 million and the haemoglobin to 65 per cent. This was followed by stovarsol and another course of emetine Further slight improvement in the blood took place and the general condition was much benefited. *E. histolytica* was no longer found. The treatment is to be continued.

H. Harold Scott.

NIÑO (Flavio L.) & MASUCCI (Antonio L.). Amibíasis ósteoarticular de la cadera. [**Amoebic Infection of the Hip-Joint.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 280–288. With 5 text figs. & 12 coloured figs. on 1 plate. [2 refs.]

In March, 1926, one of the authors found vegetative forms of *E. histolytica* in the pus aspirated from a knee, after trauma. This unpublished record is mentioned as an introduction to the present account of a girl, aged 7 years, who nine months before coming to hospital fell and injured the right hip. Seven months later she had rise of temperature with pain in the left leg. X-rays showed osteoarthritis of the right hip with luxation. At the lower end of the left tibia there was periostitis with osteomyelitis.

Pus aspirated from the hip revealed active amoebae, with a diameter of 14 to 28 microns, and nucleus 4 to 8 microns ; in some the ectoplasm was distinct from endoplasm, and within the cytoplasm were two to five red blood corpuscles and occasionally polymorphonuclear leucocytes and bacteria. The stools were loose and contained cysts of *E. histolytica*, *G. intestinalis*, and *Blastocystis hominis*.

A plate with 12 coloured figs. illustrates the forms of amoebae seen. The authors regard the case as one of localization of the amoebae in a *locus minoris resistentiae* the result of trauma, and recommend systematic examination of the faeces in all cases of osteoarthritis of uncertain origin.

H. Harold Scott.

BIANCHI (Andrés E.). Amibíasis y granulomatosis abdominal. [**Amoebiasis and Abdominal Granulomatosis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 289–297. With 5 text figs. & 1 coloured plate.

During the last six years there has been noted in the Institute of Pathological Anatomy at Buenos Aires an increasing number of cases of granulomatous growths, especially abdominal, apparently in connexion, or at least association, with amoebic dysentery. The author gives in detail another case.

A man of 38 years had had during the previous three months, frequent attacks of diarrhoea with tenesmus, glairy stools, containing blood and numerous amoebae of the *histolytica* type. There was pain in the hypogastrium and both iliac fossae, the liver extended to three fingers'-breadths below the costal margin, and the spleen was a little enlarged. There was irregular fever and rapid emaciation and the patient died [the duration of illness is not stated]. At the autopsy small ulcers were found in the lowest third of the oesophagus and also in the caecum and colon. In the liver was an umbilicated nodule, hard in consistence, greyish-white, the size of a small orange ; there were many smaller deposits. The spleen was enlarged and contained nodules varying in size from that of a grain of maize to a small nut. At the upper border of the pancreas and at the hilum of the spleen were masses of glands enlarged and occupied by growths.

The details of the histological characters are not very fully described, but are said to have shown the " typical picture of lymphogranuloma."

H. Harold Scott.

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SELLARDS (Andrew Watson) & BAETJER (Walter Albert). **The Occurrence of Atypical Amoebiasis.**—*Parasitology.* 1927. Mar. Vol. 19. No. 1. pp. 48–53. With 6 figs. on 1 plate. [5 refs.]

Conclusions :—

" A case of chronic colitis [described in 1915 (see this *Bulletin*, Vol. 6, p. 48] is reviewed in which entamoebae were found in the stools. The disease was reproduced experimentally in kittens, the infected animals showing only a mucous diarrhoea without blood and without ulceration of the intestine.

" Morphologically, the majority of the entamoebae showed remarkably atypical nuclear features. The accompanying illustrations are offered as evidence of the occurrence of true entamoebae in the discharges of an infected kitten."

H. M. H.

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TRABAUD & MICHEL. Diagnostic différentiel entre la cholécystite amibienne et l'abcès amibien du lobe de Spiegel. **[Differential Diagnosis between Amoebic Cholecystitis and Abscess of Spiegel's Lobe.]**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. May 19. Year 43. 3rd Ser. Vol. 51. No. 16. pp. 644–647.

A male patient was admitted to hospital with the diagnosis of cholecystitis, gastric derangement and " fever." Constipation had followed on light diarrhoea ; no blood or mucus in stools. The patient was found to be without fever, and examination revealed under right costal margin a tumour, apparently the enlarged gall bladder. The tumour was intra-abdominal, for it disappeared when the abdominal muscles contracted, as on the patient's sitting up ; it was very tender to palpation. X-ray showed normal sized liver ; a shadow in the gall bladder region was taken to represent that viscus, enlarged. The spleen was not palpable. The stools revealed neither amoebae nor cysts. No malarial parasites were found in the peripheral blood. A count gave 4,400,000 reds ; 1,632 whites, polynuclears 76 per cent., mononuclears 21 per cent., eosinophiles 3 per cent. The general condition of the patient was good.

That it was amoebic cholecystitis appeared certain to the authors [one wonders why so certainly amoebic] ; the dilatation of the gall bladder contra-indicated emetine treatment alone. Cholecystotomy and drainage was decided upon, in the confident expectation of demonstrating living amoebae in the contents of the gall bladder, and by inoculating the bile into a kitten's rectum to place beyond dispute the existence of the amoebic cholecystitis syndrome. Operation actually revealed an abscess in the spigelian lobe of the liver. Drainage and emetine procured uninterrupted recovery.

The authors note the absence of usual liver-abscess signs—such as, fever, enlargement or congestion of liver, which led to the diagnosis of cholecystitis. They refer to their own former observations, and those of VASSOPOULO, PETRIDIS, PETZETAKIS, TANON and RISGALLA, as establishing without doubt the reality of amoebic cholecystitis.

The differential diagnosis of this case is discussed [without any clear guide to its differentiation emerging]; and the authors conclude by pointing out the help to accurate diagnosis that could be obtained from the newer methods of radioscopy whereby the walls of the gall bladder are clearly outlined. In future, such radioscopy must be called in aid; for cholecystitis needs medical treatment, abscess of the liver, surgical intervention.

H. M. H.

BETEAU (J. P.). Contribution à l'étude de la thérapeutique de l'amibiase. [**Treatment of Amoebiasis.**]—*Rev. Méd. et Hyg. Trop.* 1927. Mar.-Apr. Vol. 19. No. 2. pp. 53–55.

A brief account of treatment of amoebiasis (acute and chronic) by intramuscular injections of iodide of bismuth, quinine and arsenic (Tri-iodo-Ercé). Of 52 patients thus treated, 7 relapsed and two died (one of tuberculosis of intestine), and 43 were clinically cured and free from relapses with no amoebae or cysts in stools for one to two years after treatment—82 per cent. successful results. There was no bismuth stomatitis or other complication. The author claims as an advantage for this therapy that it is equally effective for syphilis and malaria, which in tropical practice are often associated in the same patient.

[Details of dosage and frequency of injections are not stated.]

H. M. H.

DUPUY (L.). Essais de traitement de la dysenterie au Yatren. [**Treatment of Dysentery by Yatren.**]—*Bull. Méd. du Katanga.* 1926. Dec. Vol. 3. No. 4–5. pp. 156–160.

*Two European cases*, recurrent dysentery with wasting and exhaustion after thorough emetine treatment. Dysentery amoebae in bloody stools. Both made rapid and complete recovery, with absence of amoebae in stools, after daily clysters of yatren for 8 days, combined with yatren pills by mouth.

*Ten African natives*, primary amoebic dysentery. Complete recovery with absence of amoebae in stools after yatren clysters, and yatren pills by mouth, as in the European cases. The author remarks that in contrast to the classical emetine treatment, which led to wasting, loss of appetite, exhaustion, and even muscular paresis, yatren treatment rapidly brings about appetite and disappearance of the earthy tint of skin, and does not require for more than 8 days any low dieting.

H. M. H.

SCHWARTZ (Louis). Contribution à l'étude du traitement de la dysenterie amibienne par le yatrène 105. [**Treatment of Amoebic Dysentery by Yatren.**]—56 pp. [19 refs.] 1927. Paris: Librairie Médicale et Scientifique, Marcel Vigné, 13 rue de l'Ecole de Médecine.

The author points out the widespread dissemination [or is it only recognition, and often wrongly?] of amoebic dysentery following on the Great War. Though, since 1921, other countries have reported favourably on the effect of yatren 105 in amoebic dysentery, in France this therapy has been hitherto neglected. He records his careful observations in the hopes that his medical compatriots may be induced to give this drug further trial. He describes the composition of the drug itself; refers to the observations of [some of the numerous] workers who have investigated its effects in amoebiasis; and concludes that yatren purissimum 105 is an efficacious remedy against amoebic dysentery, for he found it effective in one case each of acute and chronic amoebic dysentery, one of the latter class with liver abscess the abscess proving fatal, and one of dysentery with lesions high in the gut, yatren being given by the mouth.

H. M. H.

PULLÈ (Felice). Tentativo di cura dell' amebiasi infantile col frutto del *Sorbus domestica.* [**The Sorb-Apple in Amoebiasis of Children.**]—*Arch. Ital. Sci. Med. Colon.* 1927 May. Vol. 8. No. 5. pp. 253–261. [6 refs.]

Four cases of dysentery are related in patients of 4 to 12 years of age. In addition to other measures the author prescribed the fruit of *Sorbus domestica*—the Sorb-apple—which is astringent, but not, it would appear, objectionably so, for the patients take it and even ask for more. The pulp of the fruit is eaten raw, or it may be pressed through a sieve, in doses of a teaspoonful every three hours, followed by the same quantity of coffee, to a cup of which a teaspoonful of brandy has been added. The results were very promising and the author records them in the hope that others may make trial of the fruit as a remedy for amoebic dysentery in children.

H. Harold Scott.

CHATRIDSE (I.). Lambliophagie durch Entamöben des menschlichen Darmes. [**Lambliophagy by Entamoebae of the Gut of Man.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. p. 242.

In a brief paper the author states that ingestion of flagellates by gut-amoebae occurs not only in man but in other animals also. Thus WENYON (1920) described such occurrence in the gut of Egyptian lizards (*Lacerta agilis* and *Agama stelio*)—the entamoebae here being morphologically indistinguishable from "*E. coli hominis.*" DOBELL (1919) records ingestion by *E. coli* of the cysts of *Isospora hominis*, *Entamoeba histolytica*, Lamblia; and of the vegetative forms of Trichomonas, and Lamblia; and that this had been observed before by GRASSI (1880), CASAGRANDI and BARBAGALLO (1897), O'CONNOR and WENYON (1917).

The author remarks that though Lamblia and Entamoeba often co-exist in the gut of man, yet ingestion of the former by the latter has apparently—in so far as the literature reveals it—been seldom observed. In his own cases he noted the ingestion by vegetative forms of *E. coli* of both cysts and vegetative forms of Lamblia, (4, 5, 6 in number), and erythrocytes as well.

He claims that the characters of their movements, of their endo- and ecto-plasm, when alive, and of the structure of the nucleus in stained specimens, sharply differentiate these amoebae from the common "*E. coli hominis*" and that they constitute a separate and true species, which he names "*Entamoeba lambliophaga coli hominis.*"

H. M. H.

DESCHIENS (R.). Recherches sur la culture d'*Entamoeba dysenteriae*. Modification du milieu et de la technique de Boeck-Drbohlav. [**Culture of** *E. histolytica*. **Modification of the Boeck-Drbohlav Medium.**]—*C.R. Soc. Biol.* 1927. May 27. Vol. 96. No. 17. pp. 1356–1358. [1 ref.]

The author demonstrated that certain trichomonads cultivable on Boeck-Drbohlav (B.D.) medium (egg, albuminous Locke-Ringer solution) (L.R.), developed better when L.R. was replaced by physiological saline solution, 7 parts in 1,000. He has found this true for *Entamoebae dysenteriae* and *E. coli.*

In a 10 mm. tube is placed 2 cc. of whole-egg, 10 parts-in-1,000-physiological-salt-solution, coagulated on slant at 75° C. for 1 hour; the coagulated slant covered by 1 to 2 cc. of egg-white, 10 parts-in-1,000-physiological-salt-solution. (This medium approximates to Craig's.) Without the albumen, the amoebae developed for 2 or 3 days and then vanished. In albuminous-physiological-salt-solution of pH 7·2 to 7·6, with added rice starch, the amoebae were found at bottom of tube in the starch sediment—but in 48 hours they had vanished. With no added starch they lived for 2 or 3 days only. Instead of the daily resowing into the 6 tubes necessary with Craig and B.-D. media, the author *decants* by pipette the liquid portion of medium, taking care to leave behind the layer lying in the angle formed by solid surface and wall of tube. This zone is richest in amoebae. Fresh albuminous-physiological-salt-solution (easy to keep on ice) is then added to the solid part of the medium. By this *daily decanting*, one tube of medium cultivates amoebae for 10-15 days. Daily resowing into fresh media, as control, showed always less multiplication of amoebae.

*For good growth of amoebae*—

(1) After each decanting and refilling 0·02 gm. of rice starch should be added and tube gently shaken.

(2) pH must be between 7·2 to 7·6; below 6·2 amoebae die and at 8·6 there is no growth.

(3) Richest growths are where layer of liquid in angle between solid medium and wall of tube is 1·5 to 2 cm. in depth.

(4) After decanting the old, the fresh liquid added should be at T° near 37° C.

H. M. H.

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MANZOLI (Giovanni). Topografia dell'amebiasi in provincia di Bologna. [**The Regional Distribution of Amoebiasis in Bologna.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Apr. Vol. 8. No. 4. pp. 194–205. With 1 map in text. [8 refs.]

This brief paper is furnished with a spot-map giving the distribution of amoebiasis in Bologna but, unfortunately, the map has been so reduced that none of the names are legible except with a lens. Only a portion of the text refers to the subject of the title, the rest consisting of general remarks of historical and statistical character.

H. Harold Scott.

## BACILLARY DYSENTERY.

WOLFF (J. W.). De Epidemiologie der Bacillaire Dysenterie in Deli. [**The Epidemiology of Bacillary Dysentery in Deli.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 140–150. [4 refs.]

This paper treats of the steady increase in bacillary dysentery in Deli, Sumatra. Statistics were collected and investigations carried out at the Central Laboratory of the Planters' Association at Medan. The increase has been specially noticeable during the early months of 1926, and may in general be traced to (1) the greatly increased importation of indentured labour from Java, as a result of the great activity on rubber and other estates. Much new land was opened up for cultivation. The coolies needed for this work bring the disease with them. As additional factors to this introduction of the disease are to be counted the overcrowding on board immigrant vessels, the temporary housing accommodation available on estates, insufficiency of latrines and defective water supply. (2) But the disease is not wholly to be regarded as an importation, for there is a source of infection in Deli itself, in the resident Batak population. Of this, however, much less is known.

W. F. Harvey.

WILKINS (Lawson). **The Incidence of Dysentery and Diarrhea among White Infants under Two Years of Age.**—*Amer. Jl. Dis. Children.* 1927. May. Vol. 33. No. 5. pp. 705–710. With 3 charts in text. [1 ref.]

The author states that bacillary dysentery is common and widespread among infants in Baltimore. Because of lack of facilities, cultures of stools were not made in the majority of these cases. The differential diagnosis was a clinical one, dysentery being diagnosed on : (1) blood or pus associated with much mucus in stool ; (2) abrupt stormy onset ; (3) fever ; (4) persistent lack of appetite ; (5) slow response to dietary treatment.

(*a*) In a group of 628 white infants under 2 years of age representative of the poorer middle class, from 7·5 to 13 per cent. developed dysentery during summer of 1925, and 27 per cent. developed simple diarrhoea. Among those not exclusively breast-fed, incidence of dysentery was 10–17 per cent. and of diarrhoea 33 per cent.

(*b*) Of all the cases of gastro-intestinal disturbance encountered, 19–33 per cent. were caused by dysentery.

(*c*) Dysentery lasts much longer than "simple diarrhoea"—more than two weeks longer in 65 per cent.

(*d*) When breast-fed infants are excluded, there is approximately the same frequency of gastro-intestinal disturbances during the first and second summer of life.

(*e*) It is important to recognize that dysentery is one of the most common infectious diseases among infants.

H. M. H.

WISEMAN (W. R.). **Outbreak of Enteritis near Glasgow. A Bacteriological Account.**—*Lancet.* 1927. Apr. 16. pp. 817–818. [2 refs.]

Over 80 adults and children were attacked during a period of some weeks with illness lasting 4–7 days. The reasons given for regarding the organisms isolated as causal are: (1) they were all identical; (2) they belonged to an uncommon group (Sonne III) of a dysenteric type. As the milk supply was suspected an examination was made of the stools of the farmer, his wife and daughter. The farmer himself gave a negative result, but his wife and daughter furnished organisms identical with those obtained from the stools of 3 patients. The daughter had not any symptoms, but the wife had suffered recently from diarrhoea. At first the biochemical reactions of the five organisms were those of *B. dysenteriae* (Flexner) but changed to become those characteristic of Sonne's group III. Serological tests with a Flexner Y serum were negative. The isolated organisms did not react with the patients' sera at the time of isolation but became agglutinable after a period of growth on artificial media. After about 9 weeks' cultivation the organisms were also agglutinated by a Sonne III bacillus serum to the full titre, 1–12,500, in fine flocculi. A saturation test with one of the organisms and Sonne III serum gave practically complete absorption of agglutinins. The author considers that his evidence points to the causative organisms being of the Sonne III group.

W. F. Harvey.

ELKELES (Gerhard) & SCHNEIDER (Alice). Epidemische Häufung von E-Ruhr (Kruse) im Jahre 1926 in Berlin. [**Epidemic Frequency of E Dysentery in Berlin.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. July 1. Vol. 103. No. 1-3. pp. 48–56. With 2 text figs. [16 refs.] [Infect. Dis. Research Board, Charlottenburg-Westend.]

The epidemic here referred to, which accounted for a considerable succession of cases, has been ascribed to the E dysentery strain of KRUSE, which is identical with SONNE's group 3 strain. Altogether in the course of 8 months 141 cases occurred. The characters of the isolated organisms were investigated in their cultural, serological and pathogenic aspects. Colonies present two distinct types, either the dentate, strictly " E form," which is irregular in shape, granular and increases in size; or the transparent, small, round, mottled colony. The latter represents the transition from the ordinary dysentery type and gives rise to daughter colonies of the E type. This E type is, according to SONNE, differentiated by its production of a 3-fold colouration of litmus milk, first to red, then to blue and then after 1 to 2 weeks or more to red again, with coagulation of the milk. It is difficult to obtain a high titre agglutinating serum to the E strain and the flocculi are finely granular; agglutination with a patient's serum seldom exceeds 1–50. The pathogenicity of the strain to white mice is small and uncertain.

W. F. Harvey.

ELKELES (Gerhard). Zur Epidemiologie, Diagnose und Namengebung der Ruhr. [**Epidemiology, Diagnosis and Nomenclature of Dysentery.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. July 1. Vol. 103. No. 1-3. pp. 57–64. [6 refs.] [Infect. Dis. Research Board, Charlottenburg-Westend.]

This is a disquisition, based upon experience obtained in an epidemic of " E dysentery " (see above).

(1) The annual summer prevalence of dysentery is probably not the result of a general transformation of non-pathogenic intestinal bacteria

into dysentery bacilli, but to a limited number of foci which owe their existence to chronic dysentery cases or to the much less common instance of transformation of a saprophyte into a dysentery bacillus. Rapid extension of the disease is accounted for by seasonably favourable conditions and the extraordinary infectivity of dysentery. Thus the key to successful control of dysentery lies in early recognition of cases and early action.

(2) The classification of dysentery bacilli is best effected by means of KRUSE's scheme. But the terms pseudodysentery and pseudodysenteric bacilli ought to be dropped. All types of dysentery bacilli from the Shiga-Kruse to the J bacillus of KRUSE should be regarded as dysentery bacilli, while the Shiga bacillus, with the necessary extension of its characters, would remain the type organism.

(3) Diagnosis of the different types may be rapidly effected by means of Shiga-Kruse serum and by certain mixtures of the so-called pseudodysentery sera. Sera corresponding to Kruse's A, D and E types serve as the basis of these mixtures.

W. F. Harvey.

KINGSBURY (A. Neave) & KANAGARAYER (K.). **The Serum Treatment of Acute** *B. dysenteriae* **(Flexner) Infections.**—*Malayan Med. Jl.* 1927. Mar. Vol. 2. No. 1. pp. 16–19.

Opinion has been almost unanimous that serum is of marked therapeutic value in bacillary dysentery provided it is polyvalent, of reputable make, and given in sufficient dosage early in the course of the disease. Its action is antitoxic rather than antimicrobic, and better results are therefore to be expected in infections with the toxic Shiga bacillus than with the feeble-toxin-producer Flexner bacillus.

FLETCHER and JEPPS gave serum to 246 Asiatic cases (Flexner 226; Shiga 20), death rate 30·1 per cent.: while in a series of 329 Asiatic cases (Flexner 318; Shiga 11) treated by salines only, the death rate was 30·4 per cent. They found failure of serum not due to exhibition late on in the disease, to insufficient dosage, or to deterioration, but rather to ill-nourishment of the patients and co-existing disease, e.g., malaria.

Of the authors' sixteen cases here described three were given the equivalent of 200 cc. and 13 that of 100 cc. There was no selection of cases. The patients were of Tamil and Chinese race, and both the serum and control (saline) series contained equal numbers of these races. Very concentrated serum was given [presumably subcutaneously, but the authors omit injection route]. All cases suffered pain and tenderness at site of injection for a few days; and one patient who had equivalent of 200 cc. developed urticaria, fever, pain in knee and shoulder joints, and oedema. Bacteriologically the serum had little effect save that in 5 cases cultures became transiently negative for a few days. A similar result occurred in only two of the control cases. Serum was not followed by any striking change in the cellular content of the bowel exudate, and as compared with the controls disappearance of pus cells from faeces was not accelerated. The time elapsing between admission to hospital and final disappearance of mucus from stools averaged 10·8 days for serum cases, and 14·4 days for the control cases. Clinically many cases were undoubtedly benefited by the serum; abdominal tenderness and tenesmus decreased. The serum treatment of *B. dysenteriae* Flexner infections in the Asiatic is not followed by magic improvement of general condition and dramatic estoppage of flux; but the patient is usually rendered more comfortable and the course of the disease somewhat shortened, if the case is not gravely debilitated and exhausted.

H. M. H.

FLETCHER (William) & KANAGARAYER (K.). **The Bacteriophage in the Treatment of Bacillary Dysentery of the Flexner Type.**—*Bull. Inst. Med. Res. Federated Malay States.* 1927. No. 3. 10 pp.

Dysentery is one of the three most deadly diseases in the Malay States, the other two being malaria and tuberculosis. Bacillary dysentery is three times as common as amoebic and is nearly all due to infection with organisms of the Flexner mannite-fermenting group; Shiga infections are rare. The bacteriophage was received from Dr. F. D'HERELLE, and was administered to 22 men suffering from Flexner dysentery. Daily examination of faeces showed that dysentery bacilli persisted in stools of six patients for more than 10 days after beginning the treatment. In eleven cases the bacilli were found up to the sixth day but not after the eighth. In five cases they were not found after the fourth day. Three patients died during treatment, and healthy dysentery bacilli were isolated from their intestines after death. All the dysentery bacilli isolated from all the patients after bacteriophage treatment were normal in appearance, growth, agglutination, and carbohydrate reactions. The bacteriophage proved more virulent for Andrewes's type strains, *in vitro*, than for freshly isolated strains. Its action *in vitro* was much stronger on Shiga than on Flexner bacillus. In a single case of Shiga dysentery, no dysentery bacilli were isolated after the second day of treatment by bacteriophage. The authors note that though this sample bacteriophage had no apparent influence on the course of the 22 Flexner dysentery cases or upon the infecting bacilli, yet it is possible that in the future a bacteriophage may be prepared which will be as potent in curing Flexner as it is said to be in curing Shiga dysentery.

H. M. H.

KOBAYASHI (Kengoro). **On One Degenerated Form of Shiga-Dysentery Bacillus caused by Bacteriophage.**—*Sei-I-Kwai Med. Jl.* 1927. Feb. Vol. 46. No. 2. English summary pp. 8–9. [In Japanese.]

The degenerated organism showed more or less the morphological appearance of a streptococcus. It stained badly and both Gram-positive and Gram-negative. Growth was difficult but remained constant in character over more than 100 generations. The carbohydrate fermentations corresponded to those of the dysentery bacillus and not to a streptococcus. Specific dysentery serum gave only slight agglutination, and that with streptococcus serum was imperfect; but complement fixation tests were positive to dysentery and negative to streptococcus serum. Its virulence was lower than that of the original strain.

**W. F. Harvey.**

DUNGAL (N.). Wie vergärt der Shiga-Bazillus? Zugleich ein Beitrag zur Biologie des *Bacillus metacoli* (Morgan). **[Fermentation of the Shiga Bacillus. Biology of** *B. metacoli* **(Morgan).]**—*Cent. f. Bakt.* I. Abt. Orig. 1927. Vol. 102. No. 4-5. pp. 218–224. [7 refs.]

The investigation has not only been carried out over a large range of carbohydrates but places on record variations and degrees of fermentation. The fermentations of *B. metacoli* (Morgan's bacillus), which are not well known, are also given: it, like the Shiga bacillus, does not ferment mannite, but is at once differentiated by its gas producing power and its positive indole reaction. Fourteen strains of B. Shiga, all indole-negative, were investigated over a period of 30 days in the medium—Peptone 1, Liebig's extract 1, sod. chloride 0·5, sugar 0·5, water 100 of pH 7·4, with bromthymol blue as indicator. The results were as follows:—

| | | | |
|---|---|---|---|
| + | glycerin | + | galactose |
| O | erythrite | + | mannose |
| O | adonite | O | lactose |
| O | dulcite | + | saccharose |
| O | mannite | + | maltose |
| O | sorbite | + | trehalose |
| O | inosite | O | raffinose |
| O | xylose | O | melecitose |
| O | l-arabinose | O | dextrin |
| O | d-arabinose | O | inulin |
| O | rhamnose | O | starch |
| + | glucose | O | amygdalin |
| + | laevulose | O | salicin |

NOTES.—glycerin, late, 5-9d.: sorbite, all except one of 4d., non-fermenters: lactose, all non-fermenters except 3 of 10, 16 and 19d.: saccharose, fermentation in 12 to 20d., with exception of 4 non-fermenters: maltose, in 4 to 18d. except 2 non-fermenters: trehalose, in 1 to 3d. except one non-fermenter: dextrin, 7 non-fermenters and 7 showing some fermentation in 4 to 20d.: starch, all non-fermenters except one of 4d.

W. F. Harvey.

MANN (W.). Vergleichende Untersuchungen ueber den Wert des Nissleschen Anreicherungsverfahrens für Bazillen der Typhus- und Ruhrgruppe im Stuhl. **[Value of the Nissl Enrichment Method for Typhoid and Dysentery Bacilli in Stools.]**—*Muench. Med. Woch.* 1927. May 6. Vol. 74. No. 18. pp. 759–761. [6 refs.]

This is a comparison of the Nissl method with one in which a variety of media is used. The former method is described as follows:—

(1) Prepare for 10 stools tests:—sterile ox bile 65; pot iodide 1; 1 per cent. malachite green 4; 3 per cent. caffein freshly dissolved at under 80° C., 30; (2) distribute in quantities of 10 cc. in test tubes of 10 to 20 mm. diameter; (3) make a uniform suspension of ¾ to 1 cc. undiluted stool in each tube; (4) incubate for not more than 12 to 15 hrs. at 37° C.; (5) remove tubes carefully without shaking; (6) transfer a large loopful or 2 smaller loopfuls to an Endo plate of not less than 15 cm. diameter; (7) rub well over the surface.

The second process is described as:—

(1) Make a uniform suspension with a piece of the test stool about the size of a pea in 5 cc. normal salt solution; (2) sow 2 to 3 small loopfuls of this suspension on a malachite green-saffranin- pure blue (reinblau) plate;

(3) rub well over the plate with a glass spatula; (4) sow a second blue plate with the same glass spatula and after that two Endo plates; (5) examine the two Endo plates after 24 hrs. incubation; (6) examine only the second of the two pure blue plates, unless the first also gives *discrete* colonies, after 48 hrs. incubation; (7) test suspicious colonies with a mixed typhoid-paratyphoid B agglutinating serum; (8) complete the examination of agglutinating organisms.

In all 791 examinations of stools from some 500 cases were carried out. The second process proved superior to the first but the first gave a larger total of positive colonies and greater inhibition of the *pyocyaneus* group of organisms.

W. F. Harvey.

PETRIE (G. F.). **On the Constitution of Dysentery Toxin and its Relation to the testing of Antidysentery Serum.**—*Brit. Jl. Experim. Path.* 1927. June. Vol. 8. No. 3. pp. 183–196. [19 refs.]

A provisional unit representing a definite amount of standard serum has already been established. Much less certainty attaches to the most suitable test toxin to be used in titration. Difference of opinion is likewise expressed on the fundamental question whether dysentery toxin is simple or a mixture of toxin and toxoid. Broth toxins were those investigated and were prepared as follows:—

(1) Sow 500 cc. of Berna peptone broth of reaction pH7·8 with the dysentery bacillus; (2) incubate 5 weeks; (3) add toluol; (4) centrifuge at time of testing; (5) pipette off the supernatant fluid for use.

The M.L.D. of the toxin was determined by intravenous injection of 15–20 gm. healthy mice of uniform breeding stock and of rabbits averaging 1,200 gm. weight. The L+ and LO doses of a toxin were determined in mice by intravenous injection of a mixture of toxin and 1-300 cc. 1 per cent. Copenhagen standard dried serum.

Altogether 17 strains of dysentery were tested and comparison was made at the same time with toxin No. 222, a filtered broth toxin, No. 203, a sulphated toxin, Copenhagen dry standard toxin, and Paris Pasteur Institute dry toxin I.P. The results are summarized: (1) Mice gave more regular results than rabbits and are to be preferred for routine titration of antidysentery sera; (2) the rabbit is 20 times more sensitive per gm. of body weight to toxin than the mouse; (3) a satisfactory degree of regularity was obtained with toxin-serum mixtures given intravenously to mice; (4) dysentery toxins contain toxoid derivatives in varying proportions and the toxoids are considerably less in broth toxins than in dry bacillary or sulphated toxins; (5) broth toxins can be used as test toxins for routine titration of sera, provided that they are occasionally checked with standard serum and a control series of tests with standard serum would seem to be unnecessary.

W. F. Harvey.

TORIKATA (R.) & FUJIMOTO (A.). **On the Cocto-Immunogen of the Dysentery Bacillus (Shiga Type).**—*Jl. of Immunology.* 1927. Feb. Vol. 13. No. 2. pp. 123–159. [26 refs.]

It is difficult to immunize rabbits with Shiga dysentery bacilli owing to their great toxicity. Cocto-immunogen, which is a boiled suspension of bacteria or of bacterial filtrate, was used on rabbits. The optimum time of boiling is of considerable importance in relation to Torikata's

" impedin phenomenon " theory. This optimum time was one hour for filtrate; most of the experiments were performed with vaccine prepared by 20 minutes' boiling. The toxicity of the vaccine thus prepared was reduced for rabbits to about one-hundredth, and animals treated by intravenous injection became resistant to infection or intoxication by B. Shiga. Their serum showed both bactericidal and antitoxic power.

W. F. Harvey.

ZOELLER (Chr.). L'immunité antidysentérique, une forme de l'immunité antitoxique. [**Antidysenteric Immunity, a Form of Antitoxic Immunity.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Mar. 17. Year 43. 3rd Ser. Vol. 51. No. 9. pp. 332–336. [2 refs.]

There is described here an intradermic reaction which is regarded as similar to the Schick reaction in diphtheria and the Dick reaction in scarlet fever. In the test 0·2 cc. of a 1–100 or 1–150 dilution of toxin, according to strength, is injected. Twenty four hours later a temporary redness is observed at the point of inoculation, but this is not the specific reaction. That does not appear until the 3rd or 4th day, and consists of an ecchymotic tinge slowly becoming more pronounced and leading to the formation of a small black slough which heals very slowly. A negative reaction is taken to indicate the presence of sufficient antitoxin in the blood to neutralize the toxin. Such antitoxin may have been developed from slight unnoticed attacks of dysentery, from a well-marked attack, or from vaccination. Ten persons were tested, six of whom had had a Hiss dysentery infection and four a severe Shiga infection. The reaction was positive in all the Hiss cases and negative in 3 out of 4 of the Shiga cases. Although suggesting this, it is not yet possible to say that the positive reaction is indicative of susceptibility to Shiga dysentery. For one thing immunity to Shiga dysentery may not be restricted to antitoxic immunity. Thus there are described also the local cellular immunity and the bacteriophage immunity to this infection.

W. F. Harvey.

FULTON (Marshall N.) & BERRY (George P.). **Agglutination Reactions in Rabbits following Oral Vaccination with** *Bacillus dysenteriae.*—*Amer. Jl. Dis. Children.* 1927. May. Vol. 33. No. 5. pp. 714–716. With 2 charts in text. [2 refs.]

From the point of view of infectiousness and mode of transmission bacillary dysentery is in many ways comparable to typhoid fever; but there is no evidence that under usual conditions it is transmitted through milk and water supplies. It is more likely that it is directly spread from patient to patient and from house to house by flies and the hands of attendants. The disease is widespread and its infectious nature little recognized so that its control by the usual methods of early detection and isolation, and observation of contacts, is hopeless. Prophylactic immunization of infants, if possible, is therefore of great importance. The majority of infections are caused by Flexner type bacilli. Observations were made on 476 white infants, under 2 years of age, artificially fed. A vaccine containing 400 millions each of five strains of Flexner dysentery bacilli (a 2,000 million bacilli gross total) was given every month, in the milk feed on 3 successive days to 107 of the infants. The frequency of dysentery among these infants was identical with that among the control 369.

This orally administered vaccine did not therefore protect against dysentery. The authors note that the production of agglutinins in rabbits by vaccination technique is no guarantee that it will procure protection in human beings. H. M. H.

WILKINS (Lawson). **An Unsuccessful Attempt to protect Infants against Dysentery by the Oral Administration of Vaccine.**—*Amer. Jl. Dis. Children.* 1927. May. Vol. 33. No. 5. pp. 711–713. [8 refs.]

The vaccine was made from a 24 hours' growth of each of five strains of Flexner dysentery bacilli, and then suspended in 0·85 per cent. saline solution, so that 1 cc. contained a billion organisms. The vaccine was fed to rabbits through a syringe after their serums had been examined for agglutinins against the strains used. Macroscopic agglutination tests with formolized broth cultures were employed. Ten rabbits so fed showed agglutinating power in the serum. Dosage was important—increasing the dose procurring distinct response when that had been absent with smaller doses. 10 cc. of the vaccine ingested by the authors and five other individuals on three successive days produced no agglutination response in dilutions higher than 1 in 20, and that in only two strains. H. M. H.

VAZ (Eduardo). Sobre o preparo da vaccina antidysenterica " per os." (Primeira memoria.) **[Preparation of Antidysenteric Vaccines for Use per os.]**—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 84–94. With 1 plate. [29 refs.] French summary p. 95.

Previous work by the author on rabbits showed the need for diminishing the toxicity of the killed Shiga organism, if this vaccine was to be used by oral administration in man. A wholly satisfactory immunization of rabbits, with 100 per cent. success, has been attained by the use of a 21-day bouillon culture of B. Shiga to which 0·25 per cent. of formalin was added. This formalinized culture immunized, in a dose of 20 cc., against the test of parenteral infection with both homologous and heterologous strains of the living organism. In practice it is very much easier to make vaccine on a large scale for oral administration by the simple addition of formalin to bouillon cultures than from agar cultures, which have to be brought into suspension, dried, weighed and converted into tablets. W. F. Harvey.

KAUNTZE (W. H.). **Polyvalent Vaccine in the Prophylaxis of Bacillary Dysentery in East Africa.**—*Kenya Med. Jl.* 1927. Mar. Vol. 3. No. 12. pp. 342–348; and *Kenya & East African Med. Jl.* 1927. Apr. & May. Vol. 4. Nos. 1 & 2. pp. 17–35. With 3 charts; pp. 51–62.

An extensive and very valuable investigation, fully described and critically discussed. The author's conclusions are:—

1. The results of inoculation of 12,000 porters [in 1916 and 1917] with 1 cc. of the polyvalent dysentery vaccine*, and of 47,636 porters with 4 cc.

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* As described in a former paper this consisted of 3 strains of B. Shiga, 2 of B. Flexner and 3 of B. Morgan [see this *Bulletin*, Vol. 17, p. 23].

of the same vaccine, do not show that any improvement in the death rate from dysentery took place in consequence, even when allowance is made for the fact that these porters were serving under the worst possible conditions of climate and country.

2. There is some evidence from other observers that inoculation of contacts and all persons liable to come into contact with infection in a dysentery epidemic cuts short the spread of the disease.

3. From the porters inoculated with vaccine no data are available to judge of the actual effect of the vaccine on the incidence of dysentery amongst them, but it may be presumed that the death rate from the disease forms a fairly good index to this and that it may be concluded that the vaccine had no appreciable effect on it, with the reservation that a short-lived protection may result immediately after inoculation and not be reflected in the death rate owing to the disease in new and previously healthy recruits being usually of mild character and low mortality.

4. There is evidence that in any body of natives, however physically strong in appearance, a considerable number are susceptible to dysenteric infection, while the remainder show varying degrees of immunity. Given then life under conditions predisposing to the disease, there is a rapid elimination of the susceptible individuals with a resultant rapid rise and fall of the death rate, and the reduction of the batch to those men with more or less immunity to infection and showing a more or less constant death rate maintained by those persons whose immunity has been undermined by conditions depressing the general level of health, and has failed in the face of sufficiently massive infection.

5. As practical conclusion—the vaccine should not be given to guard against the mere chance of dysenteric infection, unless one has opportunity to revaccinate at frequent intervals. On the other hand, in face of an outbreak of dysentery amongst a company of people, the inoculation of all contacts and persons liable to infection, is likely to prove a valuable prophylactic measure.

6. Further statistical evidence is required, showing the period during which the vaccine protects, if any ; the influence of two or more doses at ten day intervals on the immunity to dysentery produced ; the dosage that should be given at any one time to gain the maximum amount of protection ; and the manner in which the vaccine acts in producing immunity.

The author notes that in spite of the evil reputation of B. Shiga vaccines for toxicity, in none of the thousands inoculated were any more ill effects seen in Europeans or natives than follow the prophylactic use of typhoid vaccine.

As regards the problem of immunity in bacillary dysentery this investigation leads the author to conclude that :—

1. Employed prophylactically the protection conferred, if any, is of a very temporary character, but probably useful in time of epidemic.

2. Employed therapeutically the vaccine is of value, in reducing death rate, and in diminishing severity of attack.

3. In a patient suffering from dysentery effect of vaccine is immediate, contrary to the generally accepted idea as to the action of a vaccine.

4. To be of any use, therapeutically at least, and probably also prophylactically, the dosage must be comparatively large.

In addition the following points, bearing on the question of immunity, are noted by the author :—

1. In most dysentery cases seen, a disorder of liver function occurred : commonly as an excess of bile secretion in the early stages of the disease, and as a deficiency in the later.

2. Agglutination reactions of the serum were most unreliable evidences of infection and of immunity ; they appear only for a short time in the blood.

3. In any group of men exposed to conditions causing lowered vitality and presenting large opportunities for infection with dysentery organisms, a considerable number will be found to be very susceptible, and by their contracting the disease, a varying number of men are left who possess a certain degree of immunity, either naturally present from the first, or acquired as the result of an obvious or an unnoticed attack of dysentery from which recovery has taken place.

The paper closes with an interesting discussion of the problems of immunity in dysentery in the light of BESREDKA'S later researches and opinions, which do not, in fact, solve the puzzles in the dysentery problem.

H. M. H.

OTTEN (L.) & KIRSCHNER (L.). **On Oral and Parenteral Vaccination against Bacillary Dysentery.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1927. Pt. 1. pp. 97–143. [Numerous refs.]

—— & ——. Ueber enterale und parenterale Immunisierung gegen bacilläre Dysenterie (Shiga-Kruse).—*Ztschr. f. Hyg. u. Infektionskr.* 1927. Apr. 29. Vol. 107. No. 2. pp. 314–356. [Numerous refs.]

The introduction to the actual experimental work given by these authors is a very full account of the present position with regard to oral immunization in general. It treats especially of the theory of localization of immunity and of infection to definite tissues or organs. Statistical results of immunization *per os* are also considered and deservedly strong criticism is passed upon their very unsatisfactory character. The criticism indeed is not applicable merely to statistics of oral immunization but also to most immunization procedures; it leads the authors to emphasize the need for statistical investigation by "alternate case" methods. In their own experimental work on oral immunization they have used a 0·5 per cent. carbolized vaccine the organisms of which had been grown upon agar and sterilized at 60° C. Both in the enteral and the parenteral immunization 3 doses, each one larger than the preceding, were given at weekly intervals. These three successive doses were, for oral immunization as low as 5, 10 and 20 thousand million organisms and as high as 40, 40 and 80 thousand million respectively. Each dose was administered to the experimental rabbit by drops from a pipette into the open mouth. These animals were tested 3 to 6 weeks after their last immunizing dose with living bacilli, some intravenously and some orally. Besides the investigation into the possibility and utility of oral immunization against dysentery the authors have carried out research into the relative utility of a formolized heated suspension of dysentery bacilli and a formolized heated dysentery toxin (anatoxin) for parenteral (subcutaneous) immunization. The conclusions to this paper give an excellent summary of the range of subjects considered, the views of the authors, and their own results. These are:—

1. The local immunity of the intestine is not merely a matter of theoretical interest but is practically important in its relation to the pathogenesis of acute infectious intestinal diseases.

2. BESREDKA'S experimental work is incomplete and does not afford sufficient foundation for the application of oral vaccination to man.

3. BESREDKA'S main argument for a local immunity, the diminution and disappearance of antibodies from the blood with repetition of the oral immunizing dose, finds no support in the results obtained by other authors.

4. The statistical data, particularly those of VAILLANT, are absolutely insufficient to demonstrate the utility of oral immunization or even to render possible any comparison with the value of the subcutaneous methods.
5. It is possible to immunize rabbits *per os* against dysentery with a suspension of bacilli killed at 60° C.
6. This oral immunization with a bacillary suspension gives rise to immunity in the rabbit to both enteral and parenteral infection, which is higher than that obtained subcutaneously with so toxic a vaccine, but only by the use of quantities 50 to 100 times the subcutaneous dose.
7. With repeated doses of vaccine *per os* the serum of these rabbits shows an increasing agglutination titre and also contains antitoxin. This would support the view that a general immunity is produced.
8. It is possible to obtain a higher degree of immunity subcutaneously in rabbits by the use of larger doses of a suspension of bacilli killed at 60° C. and rendered atoxic by means of formalin and heat or of a bouillon culture filtrate rendered atoxic in the same way (anatoxin).
9. Subcutaneous inoculation possesses advantages over the uncertain and difficult oral immunization, especially for large scale immunization of a native population.
10. The formolized bacillary vaccine is preferable, so far as reaction goes, to anatoxin even though it does possess less antigenic potency.

W. F. Harvey.

WEISE (Kurt). Ueber die aktive Schutzimpfung gegen Ruhr im Säuglings und Kindesalter. [**Dysentery Vaccination in Infants and Children.**]—*Monatsschrift f. Kinderheilk.* 1926. Vol. 33. pp. 1–11. [30 refs.]

Immunization *per os* is most uncertain. Passive immunization, with which is to be included the use of a serovaccine, is of much too short duration and apt to leave a serum anaphylaxia. Active inoculation with killed Shiga-Kruse bacilli is not practicable owing to the production of local and general symptoms. The author tested a vaccine prepared from Flexner and Y strains, administered intracutaneously. The symptoms produced were redness and infiltration, reaching their maximum in 24 hours and disappearing in 2 days time. He concludes from the evidence that 2 injections of 0·1 cc. killed Flexner group bacilli have proved to be effective in the prophylaxis of dysentery.

W. F. Harvey.

MARREY (Paulo) & VAZ (Eduardo). " Immunização per os." Estudo sobre as differenças de poder pathogenico, toxico e immunizante de 4 amostras de B. de Shiga. [**Oral Immunization. Difference in Pathogenicity, Toxicity and Immunizing Power of 4 Shiga Strains.**]—*Mem. Inst. de Butantan.* 1926. Vol. 3. No. 1. pp. 77–82. [3 refs.] French summary p. 83.

Pathogenic power is defined as the effect produced by living organisms and toxic power as that due to dead organisms. For immunization, dead organisms are used. Whatever the mode of administration, oral, intravenous or subcutaneous, there was little apparent difference in the pathogenic action of the 4 strains. The toxicity on the other hand of cultures on agar, killed by heat, and given by the mouth was very variable: some were highly toxic, others atoxic, some capable of being used without danger for immunization and others not. The immunizing power of the strains likewise showed great variability. Two of them gave solid protection against an intravenous testing dose.

Although equally variable, there was no relation found to exist between toxic power and immunizing power. The research points to the probable value of oral immunization in man and also to the necessity for careful selection of the strains for this purpose.

W. F. Harvey.

BLANC (Georges) & CAMINOPETROS (J.). De la vaccination antidysentérique chez l'homme par inoculation intramusculaire de bacilles de Shiga vivants. [**Intramuscular Vaccination with Living Shiga Bacilli.**]—*C.R. Soc. Biol.* 1927. Mar. 4. Vol. 96. No. 8. pp. 509–511. [1 ref.]

In agreement with NICOLLE and CONSEIL the authors hold that vaccination with living organisms is more effective than any other method. The difficulty in the case of *B. dysenteriae* Shiga was its great toxicity. When they found that this organism was practically not toxic for man if uncontaminated with water of condensation, they were able to prepare a satisfactory vaccine. Cultures of a very toxic strain were grown in large tubes of specially dry agar and incubated for 24 hours in the vertical position. The growth was removed, all except the moist lowest portion, and suspended in 3 per cent. potato starch. The injections were made on the day of preparation, intramuscularly, in doses of 4 to 6,000 million. Only a slight infiltration at the point of inoculation resulted and it disappeared in 3 to 4 days; there was no troublesome elevation of temperature. They conclude, from the excellent results which they have had in children, adults and aged persons, that there is neither danger nor inconvenience from the use of living dysentery vaccine.

W. F. Harvey.

IZAWA (Tomozane). [**Studies on Ohhara's Bacillus, together with a Notice on the Causative Agent of "Ekiri."**]—*Kei-O Igaku* (*Jl. Kei-o Med. Soc.*) 1926. Aug. Vol. 6. No. 8. [Summarized in *Japan Med. World.* 1927. Mar 15. Vol. 7. No. 3. pp. 80–81.]

From cases of dysentery, Ekiri, and other diarrhoeas in adults the author recovered a bacillus and identified it bacteriologically and immunologically as OHHARA'S. Further investigation identified it also with MINODA'S para-dysentery bacilli A and B. Bacteriophages peculiar to these species were demonstrated.

Although OHHARA'S bacillus apparently constitutes a new species, its biology, as determined by animal experiments and the production of bacteriophage, would place it as a variety of dysentery bacillus. The author proposes for it the name *B. dysenteriae* Ohhara.

He believes that there are probably other still unknown causative agents of Ekiri. The bacteriology of this disease places it rather among the dysenteries.

H. M. H.

MCCALL-SMITH (N.) & FRASER (D. M. M.). **Sporadic Dysentery in England.** [Correspondence.]—*Brit. Med. Jl.* 1927. Apr. 2. pp. 645-646.

The authors describe an outbreak of dysentery in a small group of children isolated in a sanatorium on account of whooping cough. Four of the cases gave a culture of *B. dysenteriae* Y. Two possible sources of origin were: (1) a visitor lately from abroad convalescing from dysentery was in close contact with the first case, a boy 4 years old; (2) this boy was born and spent nearly two years in India. He may be a carrier.

H. M. H.

JOSEPH (G. W. N.) & MANSON (J. S.). **Sporadic Bacillary Dysentery in England.**—*Brit. Med. Jl.* 1927. Mar. 26. pp. 563–564.

An account of two outbreaks of dysentery or pseudo-dysentery, sudden, and limited in each case to one household ; affecting chiefly children, and thought at first to be some form of food poisoning. Post-mortem bacteriological, and other investigation, however, excluded food poisoning : a bacillus of the dysentery group of the Flexner Y type was isolated. The serum of one case agglutinated *B. dysenteriae* Y.

H. M. H.

## MIXED AND UNCLASSED DYSENTERY.

KLIGLER (I. J.) & WEITZMAN (I.). **Observations on Dysentery in Palestine.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. July 11. Vol. 21. No. 1. pp. 49–56. With 2 graphs.

The authors summarize their own interesting and valuable paper as follows :—

" The current reports from diagnostic laboratories in the country indicate that the common prevailing form of dysentery is amoebic in origin. A study of the material sent to the M.R.U. laboratory, and examined by an improved technique, shows that this is not the case.

" Such examination, during 1926, of over 1,000 stools, of which 307 were positive, gave the following results :

" 1. Of the positive dysenteric stools 65 per cent. were bacillary and 35 per cent. amoebic.

" 2. The distinctive epidemic character of the dysenteries in Palestine is to be ascribed to bacillary and not to amoebic dysentery. The former has two peaks, one in June and the other in November ; while the latter has the usual uniform prevalence, higher during the summer and early fall and lower in the winter.

" 3. The results reported by other laboratories are most probably due to mistaking other cells for amoebae and to the difficulty usually experienced in the cultivation of dysentery bacilli.

" Our results warrant the conclusion that approximately two-thirds of the cases of dysentery in Palestine are due to bacillary infections."

H. M. H.

JUHL (Ernst). Yatrenbehandlung bei tropischen Dysenterien der Kinder. [**Yatren in Tropical Dysentery in Children.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. pp. 237–240.

The author gives a general description of his clinical experience during two years in Matagalpa, Nicaragua, where, he writes, " tropical " dysentery is rife. It is not all amoebic. In spite of similarity of symptoms, the cause varies ; besides the amoebic cases, there are many others due to Lamblia, Trichomonas, or *Bacillus coli*. In children multiple infections are common, and in some gravely ill children besides amoeba or Trichomonas, *Ancylostoma duodenale* is present.

He admits (regretfully) that confirmation of diagnosis, and control of treatment, by microscopical examinations, were not always possible —and he therefore disclaims exact scientific value for his observation. He states, however, that differential diagnosis by microscope is not absolutely necessary, for " Yatren 105 " is a drug that ensures success in all these dysentery cases. He emphasizes his opinion that for the worst type of case in children, yatren is the sole drug that will prevent a fatal termination. In cases wasted and exhausted from the frequent and long-standing bloody diarrhoea, emetine had had no beneficial effect. In pure amoebic infections yatren is entirely successful. In children one can count on its bringing complete cure—if it be not too soon discontinued. Lamblia, Trichomonas, and *Bacillus coli* infections are more resistant. Yatren procures improvement, but not complete cure. At first, he gave the yatren to children in 2 per cent. clysma ; infants took it easily and retained it well ; but soon this was kept for the very severe cases. In all others yatren was given in powder form (0·05–0·1) three times daily, in water, or to older children in capsules, for 6 days ; discontinued for 5–8 days, and then given again for 3–5 days. This course was repeated two or three times for severer cases. It was found that yatren often procured expulsion of round-worms. In ankylostome infections, treatment with "Tetrachlor" was given after the dysentery symptoms had disappeared.

H. M. H.

DIRCKS-DILLY (J.) & BONNEL (F.). Sur un cas de balantidiase. [**A Case of Balantidiasis.**]—*Jl. Méd. de Bordeaux.* 1927. May 25. Vol. 104. No. 10. pp. 405–406. [10 refs.]

An Algerian soldier after 3 months service in Syria developed a chronic diarrhoea for which he was invalided to Bordeaux. The diarrhoea had lasted for some 2 months and the patient was wasted. No malarial parasites were found in the blood. The stools were free of blood or mucus. Their examination revealed *Tetramitus mesnili,* and numerous *Balantidium coli,* but no amoebae. The patient had already received stovarsol treatment without benefit. The authors propose to try thymol.

They quote BRUMPT, that hundreds of thousands of examinations, during recent years, of the stools of healthy and sick persons all over the world, have shown both the wide geographical distribution of *Balantidium coli,* and its extreme rarity as a human parasite. DOPTER (1924) reviewing all the then known cases of human balantidiasis, enumerated 232 (143 in Europeans). Most cases have been recorded in Russia (52), Sweden (30), and Germany (26). No case has yet been noted in England. The authors think their patient, though coming from Algeria, was in fact infected in Syria.

H. M. H.

ONGKIEHONG (H. F.). Een geval van infectie met *Balantidium coli,* behandeld met santonine. [**Case of** *Balantidium coli* **Infection treated with Santonin.**]—*Geneesk. Tijdschr. v. Nederl. Indië.* 1927. Vol. 67. No. 2. pp. 326–327.

A case of Balantidium infection causing dysenteric symptoms in a Balinese boy of 8 years. Administration on two consecutive days of 15 mgm. santonin with 30 mgm. calomel, 3 times per day, resulted in definite disappearance of the parasites with clinical recovery of the patient. Poor hygienic conditions in the patient's home and occasional contact with pigs may account for the infection.

W. J. Bais.

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DE MELLO (Froilano). Considerações sôbre alguns casos de disenteria amebiana e da emetino-resistência das amebas.—*Bol. Ger. Med. e Farmacia.* 1926. Jan.–Sept. Vol. 11. Nos. 1–9. pp. 30–33.

MUHLENS (P.). Progresos obtenidos en la terapéutica de la disentería amibiana de sus complicaciones.—*Repert. Med. y Cirug.* Bogota. 1927. Jan. Vol. 18. No. 4 (208). pp. 182–193. [2 refs.]

# PELLAGRA.

LAMBERT (Alexander C.). **Pellagra. A Case from Honan.**—*China Med. Jl.* 1927. Jan. Vol. 41. No. 1. pp. 1–6. With 1 coloured plate. [6 refs.]

Though cases of pellagra have been reported from various parts of China and also of Korea, the author states that for the last twenty years he has been on the look-out for the disease with only recent success. In Honan, during the summer of 1922, several patients were seen with acute erythema of the hands. None of these cases could be followed up and it was not until June, 1926, that the present case came under observation. The following is a brief résumé :—

The patient was a prostitute who had lived in Honan for the past three years. The present illness began in May 1925, with an abscess in the perineum leaving a recto-vaginal fistula. During the summer there was roughening and discolouration of the skin over the elbows. In January, 1926, fever, pains and diarrhoea began, followed in March by a dermatitis on the hands accompanied by a burning sensation. In June the patient came to hospital. She was then anaemic, had a staggering gait, was apathetic and presented a typical rash on the hands, face and elbows, (A coloured plate illustrates the rash on the hands.) The tongue was glazed and red at the edges and tips. Diarrhoea with muco-pus was present and the discharge from the fistula showed the presence of amoebae.

Treatment with N.A.B. and bismuth was instituted as syphilis was suspected. (The Wassermann reaction could not be done at that time, but was found to be negative at a later period.) Emetine had no effect upon the diarrhoea which was only partially controlled by tannic acid enemata.

For several months before admission the patient's diet had been deficient, consisting mainly of wheat flour with vegetables. She seldom or never had meat, neither did she eat millet or maize. During her hospital stay she was given a mixed generous diet " consisting of fresh pork, chicken, vegetables, rice millet and milk." In spite of treatment she made no marked improvement. The rash diminished but the diarrhoea continued and the mental trouble increased. The patient was removed from hospital by her friends and died later.

In discussion of the case the author asks, " what is the underlying protein deficiency which can produce pellagra in a rice-eating section of China such as the Yangtse Valley and also in a wheat and millet eating area such as Northern Honan ? " He quotes LEE (*Nat. Med. Jl. of China,* Ap. 1925. Vol. 11. No. 2) " If an adequate supply of protein in the diet has such an important bearing on the incidence of pellagra it becomes extremely puzzling why we apparently see so little of this disease in China." LEE suggested that the soy bean was the important factor, as being the source of tryptophane and lysin.

The following description of the local diet is given :—

" There are two varieties of diets in this sector of Honan, in which the principal cereals are wheat and millet. In one the millet predominates and in the other the wheat. Added to both these diets are vegetables and sprouted beans, but meat only rarely. Both the wheat and millet are grown locally. Rice is grown further South and is not much eaten by the local populace which is mainly agricultural. Wheat is ground into flour and consumed in the form of macaroni boiled with vegetables, and as steamed unleavened bread. Millet is not ground but is cooked in much the same fashion as rice, vegetables being added to the resulting thick porridge."

A. Douglas Bigland.

CANTOR (S. J.). **Pellagra: a Clinical Study, with Notes on Some Cases.**—*Med. Jl. Australia.* 1927. May 14. 14th Year. Vol. 1. No. 20. pp. 713–715. [1 ref.]

After a résumé of the chief clinical appearances and probable aetiology of pellagra the following cases are described:—

1. *Female aged* 42—Conjunctivitis for some time. In March, 1927, typical pellagrous rash appeared on the face, neck, ears and forearms. Keratomalacia was present, together with mental depression and sore tongue. No mention of diarrhoea.
2. *Female aged* 69—Typical rash on face. In former years had been depressed and suicidal. Probably a recurrent case.
3. *Female aged* 36—This patient was in a mental hospital and it was surmised that she had been transferred from an orphanage, where she had been for fifteen years, for mental defect. On admission in 1913 there was a rash on the face and chest. She improved considerably in all ways but in 1926 she again had a dermatitis, suggestive of pellagra. The condition was cured in a few weeks by diet.
4. *Male aged* 68—Melancholia for a prolonged period. In September 1926 a typical butterfly rash appeared on the face and a similar symmetrical dermatitis on the scrotum. Indigestion and spongy gums were also present. The diet had consisted of "white bread, a comparatively large amount, rice, butter (preserved), jam, some vegetables of a rather coarse quality and meat. When the latter was of the corned variety it was generally refused. No eggs entered into the dietary and milk was not available." When the diet was improved by including eggs, fruit and milk, rapid recovery took place.
5. *Male aged* 60—A chronic dement. In September, 1926, rash appeared on the face and hands. The gums were spongy and there were some gastric symptoms. The general health remained good and the dermatitis soon disappeared. The patient was never exposed to the sun's rays.

[These cases appear to be slight pellagra, but the other symptoms of the disease, such as diarrhoea, are strikingly absent.]

A. D. B.

SHELLEY (Horace M.). **Pellagra in Nyasaland.** [Correspondence.]—*Lancet.* 1927. Feb. 5. pp. 312–313.

This is a letter replying to that of Dr. STANNUS [*ante* p. 287]. Dr. Shelley points out that he was unaware that cases of pellagra had previously been reported in the general population of Nyasaland. He again argues that the disease is due to the action of a toxin upon the body in general and upon the thyroid gland in particular. The presence of peripheral neuritis in pellagra is stressed. The influence of the sun's rays in causing the distribution of the rash is negatived and Dr. STANNUS's suggestion that the scrotal rash is due to warmth and moisture is met by the question, "why are the axillae, which are both moister and hotter, exempt from the eruption?" A typical pellagrous dermatitis may occur over the great trochanters and buttocks due to friction of the loin cloth, and a patient who had been in bed for eight weeks developed a dermatitis, although there had been no exposure to direct sunlight.

The slight oedema which may occur in pellagra does not pit on pressure and is noted in patients who have had many attacks. The soreness round the angles of the mouth, mentioned by Dr. STANNUS, is not confined to pellagrins.

In conclusion the writer repeats his statement that " in pellagra there is a deficiency in thyroid secretion, a neuritis of certain nerves in preference to others and skin lesions corresponding to the distribution of those nerves."

A. D. B.

White (E. Barton) & Hadfield (Geoffrey). **Observations on Pellagra with an Account of a Case.**—*Bristol Med.-Chirurg. Jl.* 1927. Vol. 44. No. 163. pp. 31–40. With 1 plate.

Pellagra among mental patients is almost confined to those who refuse food. It is not the result of starvation but of avitaminosis. The primary lesion is probably gastro-intestinal and is due to a toxaemia resulting from a diet deficiency.

" In the care of the insane, therefore, it is of considerable importance, first, to look on all patients who consistently refuse foods as potential pellagrins, whilst realising that only a small percentage are susceptible ; second, to regard gastro-intestinal symptoms, especially soreness of the tongue and attacks of diarrhoea, in such patients as laying them under suspicion ; and, third, to regard an excessive reaction to ultra-violet light as a sufficient indication for rigorous dietetic measures."

Two cases of pellagra have recently occurred at the Bristol Mental Hospital, Fishponds, one of which is here reported :—

Female, married, aged 21. Never been out of the South-west of England. After birth of child twelve months previously, she became depressed and suffered from delusions. She took very little food.

Admitted in February, 1926, in a state of catatonic stupor. Physical examination revealed no definite abnormality except a dry red tongue. Later she began to take solid food. Early in May she became sunburned about the face and neck, but this in reality was a pellagra dermatitis. The hands were also affected. The mouth became ulcerated and suppurating bullae appeared upon the face. Towards the end of May periodic attacks of diarrhoea set in with liporrhoea and creatorrhoea. The patient became very emaciated and exhausted. Death took place on June 15th, 1926 from septic absorption. Laboratory investigations included bacteriological examination of the stools and blood chemistry, but no abnormalities were found. A full-page plate reveals the typical pellagra dermatitis.

The post-mortem findings may be summarized briefly as follows: Tongue atrophic and ulcerated. Thyroid, parathyroids and suprarenals normal. Pituitary gland rather large but histologically normal. Nothing pathological found in the heart, lungs, spleen, liver, pancreas or genito-urinary organs. The stomach showed moderate atrophic gastritis. The small bowel presented general atrophy with small haemorrhagic points. In addition to atrophy the large bowel showed superficial ulceration in the last foot of the colon. Sections confirmed this atrophy, which was especially seen in the lymphoid elements, and there was a lack of phagocytic cells in the submucosa. The changes found in the cortex and spinal cord were slight. In the mid-dorsal region of the cord small areas of degeneration in Goll's column were noted. The peripheral nerves were not examined.

As regards diagnosis the authors are satisfied that this is a case of acute pellagra. The only other skin condition to be discussed is that described by McCall Anderson and associated with porphyrinuria. In this the destruction of the skin is greater and the urine deeply pigmented. The chemistry of the urine was normal in the case above described.

In the discussion arguments are given in favour of the view that there is a preliminary avitaminosis in pellagra. The two vitamins present in the water-soluble B group are probably lacking in the disease. Neither of these can be stored in adult tissues in the same amount as is the fat soluble group, and in animals symptoms follow quickly upon deprivation. These vitamins are contained in all natural food stuffs, more especially in plant seeds, birds' eggs and yeast. They are always associated with purine and pyrmidine bases and deprivation is followed by gastro-intestinal atrophy, defective fat absorption and polyneuritis. The authors discuss the various lesions of pellagra and devote some space to porphyrin which is a structural unit common to all haemoglobins and chlorophylls. It is iron free. Light sensitiveness is found in congenital porphyrinuria but not in the haemato-porphyrinuria of sulphonal poisoning. Coproporophyrin, normally present in the bowel, may be absorbed from the atrophied gut in excessive quantities and may be the possible cause of pellagrous pigmentation.

In conclusion, stress is laid upon the importance of diagnosing possible pellagra cases in the absence of a typical rash. Treatment should include the administration of egg-yolk, yeast and hydrochloric acid.

A. D. B.

GREENBAUM (Sigmund S.). **Fusospirillary Dermatitis: its Occurrence in Acute Pellagra.**—*Arch. Dermat. & Syph.* 1927. June. Vol. 15. No. 6. pp. 678–684. [15 refs.]

Fusospirillary infection, due to Vincent's organisms, may give rise to a dermatitis in regions other than the penis, even in temperate climates. Two cases are here described. In one the infection involved the external auditory canal and in the other the hands and vulva. The latter case is of special interest because it may have been in reality one of acute pellagra in which a secondary infection with Vincent's organisms had taken place. The patient was a negress aged 32. There was a previous history of more or less constant intoxication for the last two months. Severe inflammation of the mouth was first noticed and this was followed by fever, dermatitis of the hands and vulva, diarrhoea, apathy and death in a little less than six weeks. An autopsy was performed, but did not give any help in the diagnosis of pellagra. The brain and spinal cord were not examined.

In conclusion the author states that " the moist or bullous types of acute pellagra are worth further investigation from the standpoint of this symbiosis," i.e., invasion by Vincent's organisms.

It is interesting to note that there is only one reference in the literature to this subject. SAMBON found spirochaetes in the fluid from a bleb on the hand of a patient in Roumania suffering from acute pellagrous dermatitis.

A. D. B.

SUSMAN (William). **Aetiology of Pellagra.**—*Edinburgh Med. Jl.* 1927. July. New Ser. Vol. 34. No. 7. pp. 419–422. With 1 text fig. [5 refs.]

The morbid anatomy of pellagra, the distribution of the lesions and the tissue changes suggest to the author the probability of the disease being due to a blood-borne infection. Further considerations lend support to this view, viz., the mononuclear cell increase in the blood, the work of **Palmer** and **Secor**, who obtained favourable therapeutic results with an autoserum, the monkey inoculation experiments of **Harris** and the work of **McNeal** and his colleagues.

Following the suggestion of **Wood** the presence of a protozoan organism was first sought.

"Ten cc. of defibrinated blood from a well-marked pellagrin, to which 1·0 cc. of a 50 per cent. solution of glucose had been added, was incubated anaerobically at 37° C. After 24 hours' incubation, hanging drops were examined and highly motile organisms dashed across the field especially when the material was taken from the bottom layer of the culture."

Later, stab and slope cultures were made, using equal parts of +6 glucose agar and egg broth alone. (+6 glucose agar = glucose 10 gm., NaCl 5 gm., albumin-peptone 10 gm., lemco 10 gm., agar 30 gm., water 1,000 cc. titrated with N sodium hydroxide. Egg broth = egg 1, water 300 cc.)

Abundant controls were made and tubes were inoculated and cultured anerobically from all parts of the original blood culture. In about six weeks there was quite an abundant growth consisting of white opaque colonies. Inoculations from the bottom layer of the blood culture gave the best results Subcultures on sloped blood agar gave a marked growth within a week.

The organism is an anaerobic bacillus of about 0·5 to 2$\mu$ in length and about 0·2 to 0·5$\mu$ in width. It stains readily with aniline dyes giving a coccal or diplococcal appearance but with Loeffler's methylene blue a polar staining bacillary form was found. Neisser's stain gave negative results, but dilute carbol-fuchsin stained the bacillus readily, showing rounded ends. The organism is gram positive but not acid-fast and it was propagated through four subcultures. Agglutination reactions with dilutions up to 1 in 640 gave positive results.

The same bacillus was isolated from another pellagrin in whom the skin eruption was recent.

In an appendix to this work the author describes more experiments which were made after the paper was written. The organism was isolated from two more cases of pellagra, thus making four in all. A simplified technique is described.

" About 5 cc. of blood from the pellagrin is pipetted into a tube of broth or glucose broth, the surface of the broth having previously been covered to the depth of one inch with sterile liquid paraffin. The culture is incubated at 37° C. This original culture is subcultured about every week until the culture is no longer pigmented with haemoglobin. At that time there usually is an appreciable deposit of growth at the bottom of the culture tube."

Later the organism was found to act varyingly to Gram's stain and to have no definite sugar reactions.

A. D. B.

**Debré** (Robert) & **Petot** (Cl.). L'acrodynie infantile, ses liens avec l'acrodynie épidémique de l'adulte, l'ergotisme, l'arsenicisme chronique et la pellagre. [**Infantile Acrodynia, its Relation to Pellagra and other Conditions.**]—*Presse Méd.* 1927. June 15. Vol. 35. No. 48. pp. 753–756. With 2 text figs. [4 refs.]

The comparatively recently discovered and rare syndrome, known as sporadic infantile acrodynia, is here described. Its possible connexions with epidemic acrodynia, ergotism, chronic arsenical poisoning and pellagra are discussed.

It will be sufficient here to give a description of the syndrome and to point out how it differs from pellagra.

Sporadic infantile acrodynia attacks children between the ages of six months and eight years. The onset is usually insidious, the chief symptoms of this stage being alterations in character, headaches, insomnia and severe paraesthesiae in the limbs. Then follow trophic changes in the extremities; these vary in intensity from a mere erythema, with some infiltration of the tissues, up to gangrenous mutilations, usually of the fingers. Other trophic changes are falling of the nails, hair and teeth, the last with or without gingivitis. Secretory troubles are represented chiefly by profuse sweating and salivation. Mental changes may be very marked and the child loses all interest in, and knowledge of, its surroundings. Muscular weakness, especially in the legs, is marked but this is more a hypotonia than a true paralysis.

There is no fever throughout the whole course of the malady.

The last stage of the disease is dramatic and unexpected—gradually all the symptoms disappear, leaving only the deformities due to the gangrene; otherwise complete recovery is the rule.

It may be interesting to point out that in 1828–1830 there occurred in Paris an epidemic of what was called acrodynia, which attacked within six months at least 40,000 persons. It is to be noted that these were aged people and adults, children being rarely affected.

This is to be contrasted with present-day acrodynia which is sporadic and practically confined to children and shows marked mental changes, which last were extremely rare in the epidemic form.

With the resemblance of this condition to ergotism and chronic arsenical poisoning it is not proposed here to deal.

At first sight the connexion between acrodynia and pellagra seems to be fairly close, but the authors stress the following differences, viz., the intensity of the mental troubles in pellagra, the character of the erythema, with its localization to uncovered areas and its relation to the sun's rays, the chronic evolution of the disease and the frequent gravity of the prognosis.

A. D. B.

Richert (G.). [Les pellagres animales. (Thèse doctorat vétérinaire, Paris, 1926, Jouve édit.).] [**Pellagra in Animals and Man.**]—[Summarized in *Ann. d'Hyg. Pub. Indust. et Sociale.* 1927. Feb. Vol. 5. No. 2. pp. 114–115.]

A comparative study of animal and human pellagra is made. The author points out that maize causes pellagra in man; buckwheat causes " fagopyrisme " in the sheep, goat, ox, pig and horse; clover causes " trifoliose " in the horse, the ox and the sheep; the vetches give rise to gangrenous dermatitis in horses and oxen, while St. John's Wort determines a syndrome of cutaneous, digestive and nervous symptoms in the horse and ox.

The author insists upon the harmfulness of fluorescent substances. Personal observations upon " accidents pellagreux " are made on horses and oxen fed with hay containing St. John's Wort, the whole of which plant is toxic and which presents the photodynamic properties of fluorescent substances.

Pellagra in man and in animals is due to the absorption of a toxin which only acts in the presence of the sun's rays and when the skin or coat is white. The radiations responsible are found in the infra-red zone and penetrate those regions of the skin unprotected by clothes or adequate pigmentation.

[This abstract deals only with a summary of the author's original thesis.]

A. D. B.

Goldberger (Joseph) & Wheeler (G. A.). **A Study of the Pellagra-Preventive Action of the Tomato, Carrot, and Rutabaga Turnip.**—*Public Health Rep.* 1927. May 13. Vol. 42. No. 19. pp. 1299–1306. [8 refs.]

The study of pellagra-preventive diets has been in progress at the Georgia State Sanatorium for the last ten years. The present work deals with the value of tomato, carrot and Rutabaga turnip in this respect.

*Tomato.*—It has been previously thought that this vegetable was lacking in P–P factor. It was suspected, however, that this view was erroneous and that in former experiments insufficient quantities had been used.

In April, 1925, 21 insane patients came under observation for preventive treatment with tomato juice. Of these patients one remained under observation for a very short time, one for eleven months and 19 for at least one year. None developed pellagra, though experience shows that 40–50 per cent. would have shown signs of the disease under ordinary circumstances. The daily ration was 40 ozs. of the juice expressed from commercial canned tomatoes. This was divided into three portions and taken with each meal as a beverage.

*Carrots.*—Underhill and Mendel found that carrots were very effective in alleviating black-tongue in dogs. To ascertain the presence of P–P factor a small group of insane patients had a daily cooked ration of the equivalent of one pound of the dressed raw vegetable added to their diet. Pellagra occurred in five of these cases, but rather later than might have been expected under ordinary conditions.

*Rutabagas.*—This vegetable, given in the same daily amount as the carrots, failed to prevent pellagra in a small group of insane patients.

The authors conclude as follows:—

" The failure of the carrots and of the rutabagas may have been due to the ingestion of a quantity which, although seemingly liberal, was too small; nevertheless, if carrots and rutabagas, as is probable, actually possess pellagra-preventive action, this must be rather feeble.

" Although definitely demonstrated, the pellagra-preventive potency of canned tomatoes must be rated as of a feeble order.

" Tomatoes are recommended for use in the treatment of active cases of pellagra, and it is suggested that a more liberal use of this vegetable, particularly in the late winter and spring, be encouraged as a preventive measure."

A. D. B.

## LABORATORY REPORTS.

ARCHIVES DE L'INSTITUT PASTEUR DE TUNIS. 1926. Apr. Vol. 15. No. 1. pp. 1–70. With 46 text figs. Notice sur l'Institut Pasteur de Tunis. **[The Institut Pasteur of Tunis.]**

This interesting document cannot be summarized, being itself a retrospective summary of the accomplishment of a long series of years much " foreshortened in the tract of time."

From the historical introduction we learn that the Pasteur Institute of Tunis germinated (very much as the great sponsor's own most prolific discoveries originated) under the happy auspices of Bacchus, in a study of the fermentation of the grape ; and opened forth, in 1893, as a " Laboratoire de Vinification." By what may be regarded as a humorous whim of fate, an antirabic office was connected with it in the following year ; then by subsequent cognate additions it became, in 1900, a Pasteur Institute—the third in order of seniority in the French dominions. The output of its scientific work of thirty years is a veritable epic, where the great engagements occupy the fields of typhus and relapsing fever, and invade the shadowy domain of the filterable viruses and inapparent infections, centring round the names of NICOLLE and CONSEIL, and BLAIZOT. All these and other things are they not set forth in the "*Annals*" of the Institute ? From their beginning in 1906 and continuation until 1920, and again from 1923 onwards these were published as *Archives of the Pasteur Institute of Tunis* ; but in the interval between 1920 and 1923 they appeared as *Archives of the Pasteur Institutes of North Africa*, which were published at Algiers and Tunis alternately. All these things have been published ; but what has not until now been made public is the fact that this Pasteur Institute, which has bestowed great and manifold blessings upon the people of Tunis—and on populations far beyond—has not received a single bequest, or a private donation worth mention.

A. Alcock.

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SERGENT (Edmond). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1925. **[The Work of the Pasteur Institute of Algeria in 1925.]**—*Arch. Inst. Pasteur d'Algérie.* 1926. Mar. Vol. 4. No. 1. pp. 111–142. [56 refs.]

This report, though full of local and official interest, does not contain much pasture for the general. Among items of general interest it may be noted (1) that the leaven of vinous fermentation has been observed to be spread not, as has been thought, by wind, but by Drosophilid flies ; (2) that the immunity conferred by vaccination against smallpox does not last nearly so long in the climate of Algeria as it does in Europe ; and (3) that two plants of common occurrence in N. Africa have been incriminated as poisonous, namely, *Lotus jolyi* (Leguminosae), the leaves and twigs of which contain hydrocyanic acid, and *Entoloma lividum* (Fungi), which causes fatal choleriform effects.

A. A.

KENYA, Colony & Protectorate of: **The Annual Report of the Medical Research Laboratory for the Year 1924.**—31 pp. Nairobi: Swift Press Ltd.

The report of the Analytical Chemist is not here considered as it deals with Public Health and Economics.

In the Medical Research Laboratory the work has been mainly of a routine character, but it is pertinent to remark that routine investigation for clinical ends is always complementary to research—and, indeed, in new countries is itself research of fundamental importance.

Of 2,000 analyses of blood films malaria parasites were observed in 378—subtertian in 81·2 per cent., benign tertian in 12·4 per cent., and quartan in 5·0 per cent. of them.

Of 184 examinations of morbid tissue 17 proved to be malignant tumour—carcinoma and sarcoma and their varieties. Of these, 11 came "from natives untouched by civilization living a primitive life in the native reserves." The Reporter, who recommends these facts to the notice of the faddists that deny—and explain—the absence of malignant disease among uncivilized tribes, attributes the facts to the larger field of diagnosis afforded by the establishment of hospitals and dispensaries in the native reserves.

It is noted that examinations of stools for pathogenous Protozoa is now a more critical business, by the employment of iron-haematoxylin staining, than it has been in the past. A case of dysentery concomitant with heavy infestation of Giardia improved as the Giardia disappeared. Helminth infestations in 150 of 731 samples of stools—Taenia in 61, Ancylostoma in 30, Trichiuris in 21, Ascaris in 18, Strongyloides in 9, Schistosoma in 2, and Hymenolepis in 1. A large number of cases of dysentery with muco-sanguineous stools was observed in which no organism, either Protozoon or Bacteriid, could be discovered; they all yielded to saline treatment. The discovery of a virulent strain of the Klebs-Löffler bacillus is noted.

Agglutinations with standard sera of European origin still give inconclusive results; the medical officers report many cases of clinical typhoid, but most of the sera received for diagnosis are negative. This, however, is not the case with the cases of undulant fever that occasionally occur.

Plague vaccine and calf lymph vaccine are manufactured in the laboratory and 135,480 doses of Na–K–Bi–tartrate were manufactured by the Bio-chemist.

The Reporter has some deprecatory remarks on the scheme of teaching native Africans to be laboratory assistants before they have received any mental training of a fundamental kind. A. A.

KENYA, Colony & Protectorate of: **Annual Report of the Medical Research Laboratory for the Year 1925.** [KAUNTZE (W. H.), Director.]—*Kenya Ann. Med. Rep. for Year ending 31st December, 1925.* pp. 107–149. With 1 folding table & 1 diagram.

From this report of a full and well-organized routine, where, moreover, original research work, having already been published in Vol. I of the *Kenya Medical Journal*, is but nominally noticed, the following items of general interest must be selected.

A trypanosomiasis survey has gone far enough to justify the belief that tsetse-fly control is a less difficult problem in Kenya than in adjoining territories.

A first-hand comparison with S. Africa in respect of plague has shown that the natural conditions there are paralleled in the Nakuru District of Kenya. Here, though the wild rodents are fewer in species, most of them are identical with species that are known to be susceptible to plague in S. Africa. Here, moreover, the black rat abounds in all farmhouses and native huts, so that plague once entering through susceptible wild rodents would very certainly be disseminated among the population by that rat.

The results of a comparison between the Bordet-Wasserman and the Sigma test in cases of yaws showed both tests positive in 193 instances, both negative in 98 instances, Sigma negative and B.W. positive in 10 instances, and *vice versa* in 23 instances.

In the preparation of calf-lymph (which was in enormous demand) the amount of added glycerine was 6 times the weight of pulp, without detriment to results as testified by district medical officers. Cleansing of the calf's belly with ether as well as sterile water before vaccination and before reaping the vesicles lessened the bacteria in the pulp.

Of 57 pathological specimens from natives 18 were malignant growths, 13 of them being sarcomata.

On several occasions organisms isolated from dysentery stools agreed culturally with a Flexner strain and agglutinated with their own cultures though not with cultures from the Oxford University laboratory. In 2,390 smears from rats' spleen, made mostly in the ordinary routine, 8 disclosed plague.

Of 2,452 blood-smears examined 318 showed malaria parasites, 289 being *P. falciparum*. Of 1,071 samples of faeces 118 contained the cosmopolitan protozoa and 450 contained eggs of helminths. In 106 samples containing blood, mucus, etc., neither protozoa nor helminth eggs were found.

In the S. Kavirondo district about 1½ sq. mile of good riverine land have been freed from *Glossina palpalis* and made safe for occupation, by clearing and stumping about 1¼ mile of river bush and 400 or 500 yards of hill-jungle above—a result that has impressed and wonderfully heartened the natives. During clearing the fly-swarms are observed to become disorganized.

Of 848 rat-fleas identified 35·1 per cent. were *Xenopsylla cheopis*, 15·0 *X. braziliensis*, 44·8 *Echidnophaga gallinacea*, and the remaining 4·9 per cent. included *Ctenocephalus canis* and *felis* and *Dinopsyllus lypusus*.

In the Administrative Section great disappointment is expressed of attempts to train native laboratory assistants without the essential adjuncts of harness and discipline, and complaints are made in the pathological section of very imperfect accommodation for post-mortem work, and in the entomological section of the want of an insectarium—a crippling deficiency indeed.

A. A.

UGANDA PROTECTORATE. **Annual Report on the Bacteriological Department for the Year ended 31st December, 1925.** [DUKE (H. Lyndhurst), Director.]—7 pp. 1926. Entebbe: Govt. Printer.

Owing to the absence of the Director on other employments and on long leave, and to the extraordinary demands made on a staff, thus temporarily reduced, for plague and smallpox vaccine, research work was very much in abeyance in 1925 and the report for the year consists of constructural and statistical details of an interest purely local.

A. A.

NIGERIA. **Annual Report of the Medical Research Institute, Lagos.** [CONNAL (Andrew), Director.]—*Ann. Med. & San. Rep. Nigeria, 1925.* Appendix A. pp. 1–37. With 1 chart.

The following items of this perspicuous report are selected as of general interest.

Plague.—The observation and record of the results of *direct* inoculation from guineapig to guineapig were carried on through the greater part of the year. In one series an infection from a bubo in man died out in the 13th succeeding animal; in this series the fatal successions were at 9, 8, 7, 4, 4, 5, 8, 7, 4, 3, 4, 7, 9 days, in their order. In another series an infection, derived from the guineapig of the first series and transmitted to a monkey whose juices (mixed spleen, lungs, and bronchial glands) were inoculated into a guineapig, was carried on through a sequence of 43 more guineapigs in a term of 223 days; in this series of 44 the longest survival after inoculation (apart from the last two of the series, in which it was 22 and 23 days) was 9 days,and the shortest 2 days, but 3 to 7 days was the commonest; in one side-inoculation from this series the only macroscopic signs observed in the guineapig *post mortem* were two small inflamed glands at the site of inoculation, and no signs of plague were found in another guineapig inoculated from this animal; in another side-issue of this series a guineapig—the last but one of the series of 44—developed a bubo rapidly but showed no other signs of illness, although the pus aspirated from the bubo and applied to the scarified skin of another guineapig was responsible for an infection carried through another series of 12 guineapigs. In this latter series a big proportion of the animals' lungs were affected. The general conclusions formed from four independent series of inoculations, involving 98 guineapigs and a term of observation extending over 298 days, are as follows:—

> " Rarely did the infection terminate fatally in less than 3 days, at the stage of an acutely inflamed bubo, and when it did happen the toxaemia must have been profound. Most of the deaths took place in from 4 to 6 days, when the bubo had become haemorrhagic and friable, with small beads of pus. In the earlier stages of this condition of the bubo the spleen is usually finely speckled, i.e. with minute abscesses. In the later stages the spleen practically always shows speckling but . . . larger abscesses, and in some cases the liver shows the same appearance. When the bubo had become definitely broken down and purulent it was the rule to find abscesses in both the spleen and the liver. Still later when the contents of the bubo have become thickened and caseous, the lungs may also show abscess formation."

Another instructive observation was a succession of hospital cases revealing the existence of a form of pneumonic plague in man where the sputum is the typical rusty sputum of ordinary pneumococcal pleuro-pneumonia, the plague bacilli being so scanty, or so transformed and whelmed among other micro-organisms as to debar diagnosis—except by inoculation of a susceptible animal.

Rodents and their Ectoparasites in connexion with Plague.—The rat campaign accounted for 154,007 rodents (among which an Insectivore, *Crocidura manni*, is included), and the species are *Rattus rattus* and *norvegicus*, *Mus musculus*, *Cricetomys gambianus*, and *Lemniscomys fasciatus*, of which *Mus musculus* was much the most numerous. *R. rattus* outnumbered *norvegicus* in the proportion of about 9 to 1. Plague-infected rodents were found in every month but April; were most numerous in October; and all but 26 of them were found in the latter half of the year. There were many more infected *rattus* than *norvegicus* (247 to 26) but the *proportion* of the former to the latter was as 9 to 7. It was noted that in staining smears of rat-spleen with carbol-thionin infected smears turned slate-blue " in practically every instance." The ectoparasites found on the rodents were *Xenopsylla cheopis* and *brasiliensis* and *Laelaps echidninus*. Some exact experiments, similar to those done in India, were made with guineapigs allowed freedom in native houses under diversified conditions; the guineapigs did not contract any fleas in a room that had been disinfected the day before with kerosene and cyllin spray, but they did get fleas in houses that had undergone gaseous disinfection.

Yellow Fever.—The disease was unusually severe in Nigeria and particularly in Lagos where it was worst in April and May. Of 15 fatal cases 13 were Europeans (mostly British), 1 was a Syrian and 2 were Africans. Except that in a single slice of a liver (Levaditi stained) two bodies " very like Leptospira " attracted attention, no undoubted Leptospira was discovered by any of the diverse methods employed for their detection.

Blackwater Fever.—Twenty cases (3 fatal) are analysed, distributed over the whole twelve months, excepting February and April; 17 British, 1 Syrian, 1 Indian, 1 West Indian; 5 occurring in the third decade of life, 4 in the fourth, 10 in the fifth; of the 13 cases credited with a previous residence 6 had lived in the tropics for five (5–25) years or more. " The association of the sub-tertian malaria parasite with the actual condition of blackwater fever is demonstrated in 10 cases." The further details of a careful and critical analysis may be looked for elsewhere.

Leprosy.—Patients who had been brought up to the maximum dose of moogrol retrogressed when the treatment was altered to copper sulphate in daily half-grain dose. All patients on sodium morrhuate followed by hydnocarpate " have willingly undergone the treatment " and " come forward for their twice-weekly injections."

Entomology.—Two thousand individuals (male and female in numerical equality) of *Aëdes* (*Stegomyia*) *argenteus* have been critically examined, and in many instances photographed, in respect of their colouration, and the markings of the legs, as well as the colour and markings of the abdomen, have been found to exhibit a very wide diversity; the shape of the lyre on the thorax however is least of all variable. Cross-breeding experiments with Aëdes species have been attempted. The survey of the endoparasites of " wild " biting insects has been continued. Feeding experiments with *Aëdes argenteus* in cases of yellow fever have been carried on—besides a large amount of more prosaic routine work.

Dermatology.—A promising survey of the skin lesions prevalent in Lagos has been started.

Histology.—Twelve specimens of malignant growth have been observed—7 carcinomata and 5 sarcomata. Negri bodies were discovered in the brain of a dog shot [for reasons not stated].

Coprology.—Attention is drawn to cases where red blood cells or pus cells, or epithelial cells, or Charcot-Leyden crystals occur in suspicious stools in which neither pathogenous protozoa nor dysentery bacilli can be detected; 27 such cases were investigated.

A. A.

GOLD COAST. **Annual Report of the Medical Research Institute, Accra, from April 1st, 1925, to March 31st, 1926.** [YOUNG (W. A.), Director.]—*Gold Coast Rep. Med. & San. Dept. for Period Apr., 1925–Mar., 1926.* Appendix A. pp. 38–50.

This report covers the usual fields of investigation and the following items may be noticed. A tsetse-fly and trypanosomiasis survey, by the Director, in the country watered by the Volta river (see this *Bulletin*, Vol. 23, p. 290). The late Major INGOLDSBY located three fly-belts in the Oda and Ho districts. Histological examinations include 223 specimens of various organs, and among them 37 tumours have been identified, chiefly from "bush" (not town-bred) Africans; 13 are classified under sarcoma and 13 under carcinoma, 11 being benign. A puzzling case of vulvar ulceration was finally resolved by the discovery of eggs of *Schistosoma haematobium.* Plague did not appear during the year either in man or in the chronic form in rats. In cases diagnosed as yellow fever Leptospira could not be found in the blood or in inoculated guineapigs, nor could lime-casts be discovered in the kidneys. Of 46 cases diagnosed as bacillary dysentery by microscope 36 were cultivated, but only 3 of these gave serum agglutination—a result that suggests future investigations. A paper on the "Pathology of Prolonged Emetin Administration" has to be noticed elsewhere (*ante*, p. 13).

A. A.

VAN DEN BRANDEN (F.). Rapport sur le fonctionnement du laboratoire de Léopoldville en 1925. [**Leopoldville Laboratory Report for 1925.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. pp. 283–312. [10 refs.]

Eleven pages of this report are filled with tabulated routine detail and 4 more with bare official statements relating to educational institutions. Some of the contents—e.g., the results of antipneumococcic vaccination, the action of "Bayer 205" in human trypanosomiasis, and the report on the tuberculosis institute—are abstracts of documents that appear independently and have been (or will be) noticed in the appropriate sections of this *Bulletin*; so that there is not much left for notice here.

In the therapeutics of human trypanosomiasis, besides "Bayer 205," the effects of tryparsamide and of stibosan, and the non-effects of "Targowla" have been observed. In cases where tryparsamide is unsuccessful this is attributed either to the co-existence of syphilis, or to some prior arsenical treatment having rendered the trypanosomes resistant. Patients have easily tolerated stibosan (Heyden 471) given in a series of intravenous injections of 0·2 to 0·3 gm.; its action is said to be slower than that of tartar emetic, but more rapid than that of stibenyl, and not much beneficial in chronic cases.

Antimosan (Heyden 661), supposed to be more active than 471, was tried—and was well tolerated—by gluteal injection in 14 cases of malaria in children; in several of them the parasites did not disappear after a series of 1 cc. injections; in other cases it had no constant effect on subtertian and quartan parasites even when given concurrently with quinine.

Neotrepol tried (in local application) for tropical ulcer was judged to be not better than neosalvarsan.

A. A.

SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH. **Annual Report for the Year ended 31st December, 1925.** [LISTER (F. Spencer), Director.]—37 pp. With 2 plates. 1926. Johannesburg: P.O. Box 1038.

The more general interest of this report is to be found in the research section—on Plague studies.

Although actual infection among rodents of the veld is at present scanty (probably because rodents are still scarce after the epizootic of 1923–24), and although only 4 species (the Lobengula gerbille, the multimammate mouse, the ground squirrel, and the striped mouse) are of practical importance in spreading the disease, yet in the laboratory 10 species of them have been found to be susceptible to plague, and even more sensitive to infection than guineapig or black rat. Curiously, the most susceptible of all (the Karroo rat) is the one that is believed to escape infection in nature, its immunity under natural conditions being probably due to its having its own particular properties in fleas. Infection among Lobengula gerbilles is readily transmitted by eating infected comrades—a prevalent habit of this species. Experiments in inducting clean animals into old burrows believed to have been depopulated by plague suggest that infection may lurk there for at least six months. In the course of the survey a new disease, caused by a novel gram-positive motile bacillus and as virulent as plague, was discovered in gerbilles; it is communicable to mice and smaller wild rodents, but not to black rat, larger wild rodents, cat, dog, and monkey; its characteristic pathological features are extensive necroses in liver and spleen, with bacteraemia. Among entomological items some evidence of a seasonal variation in the numbers of *Xenopsylla cheopis* came to light, and two of the commoner fleas of wild rodents (namely, *Dinopsyllus lypusus* and *Chiastopsylla rossi*) were found capable of transmitting plague between rodents, experimentally.

Particulars are given of the results of examinations of various local collections of mollusks for evidence of schistosomiasis and other fluke-infestations.

In 1,100 histological examinations of material from surgical and post-mortem sources the diagnosis of carcinoma was made in 232 cases and of sarcoma in 31; particulars of race are not given.

Of 9,024 (2,501 European and 6,523 Native) specimens of sputa examined for the Miners' Phthisis Medical Bureau, 283 European and 1,376 Native were positive for *Bacillus tuberculosis*.

A. A.

MAURITIUS. **Report on the Work done at the Bacteriological Laboratory from October, 1925, to September, 1926.** [BARBEAU (L. G.)] 5 pp. 1926. Jan. 4. [Received from the Colonial Office Apr. 9, 1927.]

During the year 1925–1926 the work of the Mauritius Laboratory included over 6,000 observations in a very wide field. In the course of

1,824 blood examinations the embryos of *Filaria bancrofti* and all the three species of malaria parasites were observed; and in 60 out of 210 examinations *ad hoc* specific agglutination tests for typhoid were positive but not at all for paratyphoid. The tubercle bacillus was found in 72 out of 322 samples of sputum; and Löffler's bacillus in 81 out of 285 throat swabs. In three fatal cases of influenza an organism identical with Pfeiffer's bacillus was cultivated from the cerebrospinal fluid. In the 1,606 specimens of faeces examined the following parasites were noticed: *Trichuris trichiura* in 554, *Ascaris lumbricoides* in 251, Ankylostoma in 129, *Strongyloides intestinalis* in 24, Oxyuris in 1; and Lamblia in 88, Trichomonas in 37, *Tetramitus mesnili* in 3, *Balantidium coli* in 1, and *Isospora hominis* in 2. In the course of 102 examinations of centrifugated urine eggs of *Schistosoma haematobium* were detected 34 times, microfilariae 3 times, and Trichomonas 6 times. Among histological examinations the eggs of *Schistosoma haematobium* were found in four specimens of vaginal scrapings, and were discovered in a tumour taken from the mesentery of a young woman otherwise apparently free from bilharzia infestation. The tumours identified histologically were squamous epithelioma, scirrhus, adenoma, papilloma, sarcoma, fibroma, and myxoma. The number of infants vaccinated against tuberculosis during the first 9 months of the year was 486. A considerable variety of therapeutic vaccines were prepared; a case is mentioned of successful local treatment of a long chronic conjunctivitis with an autovaccine derived from a diphtheroid organism isolated from the conjunctival secretion. For the Public Health Department 926 samples of foods and drinks were analysed. Medico-legal investigations numbered 218, of which 18 related to cases of rape and 11 to cases of murder.

A. A.

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FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research for the Year 1924.**—17 pp. Kuala Lumpur: F.M.S. Govt. Press.

In the medical and pathological section of this succinct and lucid report the chief subjects of discourse, outside the daily routine, are the new Institute for the prophylactic treatment of rabies and two novel varieties of infective disease—namely, Tropical Typhus and Melioidosis, both of which have already been noticed in this *Bulletin*, the former in Vol. 22, p. 944, and Vol. 23, p. 888, the latter in Vol. 22, pp. 659–662. The clinical and serological features of Tropical Typhus are now described and some aspects in the aetiology suggestively considered. Briefly, the disease is similar to typhus, but is not spread by lice and does not occur in crowded cities. In the 18 cases that have been observed all the patients lived or worked in open uncultivated country, 10 of them having been cattle-keepers and 6 more having been occupants of a camp pitched on a grazing ground. This association with cattle suggests ticks as probable carriers, and—since rats are generally to be found where cattle are kept—rats as probable reservoirs of the virus: in the course of nature, on this theory, the tick larva would be infected from the rat and the adult tick would disseminate the infection. The "new" glanders-like disease, Melioidosis, has already been considered at some length.

In the section on morbid histology, 39 cases of malignant tumour are recorded—chiefly carcinoma and varieties of sarcoma—among coloured races, namely 4 Malay, 23 Chinese, and 12 Tamils.

The report of the Malaria Bureau describes some observations on the reaction of waters inhabited by Anopheles larvae. The species found in jungle clearings have a preference for acid water with a pH range from below 5·5 to 6·6, but those found in open marshes and rice-fields and ponds commonly occur in water of less acidity (pH 6·4 to just below 7·0), and *A. umbrosus* has, so far, been found in very acid water pH below 5·0). But " there are doubtless many other factors, determining the prevalence of larvae of particular species, besides the degree of acidity or alkalinity of the water, and it is to the chemical causes and biological concomitants of the latter that we must look for new light." A survey of these " biological concomitants " is in progress, of which a few interesting but not particularly important details are given. In experimenting with larvicide it was observed that the filtrate from a suspension of Paris green is larvicidal.

In the report of the Chemist it is mentioned that during the year 7,251 fluid ounces of Vitamin B extract from rice-polishings were issued to the medical profession for the treatment of beriberi.

A. A.

FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research for the Year 1925.** [STANTON (A. T.), Director of Govt. Laboratories.]—30 pp. 1926. Jan. 31. Kuala Lumpur.

This Report also includes the Reports of the Pasteur Institute, of the Malaria Bureau (which is to be noticed in the Malaria Section), and of the Chemical Laboratory. The principal items included in the main of the Report are investigations of the treatment of malaria, of the nature of tropical typhus, of the treatment of dysentery, of the vitamin B content of rice-polishings, and of the local existence of Weil's disease, and a classified list of the tumours histologically determined.

In the Pasteur (antirabic) Institute 123 cases received attention, of which 70 underwent the complete course of treatment; no deaths occurred during or after treatment.

The results of the work on the treatment and diagnosis of malaria have already been published, either as Bulletins or in the *Indian Medical Gazette*, and appreciated. Similarly with the work on tropical typhus, which is now stated to be as common in the Malay States as typhoid fever; there is still no evidence of transmission by lice, and no further corroboration of the hypothesis of conveyance by ticks, nor have attempts at transmission to guineapigs been successful. In the treatment of dysentery serum was found to be insufficiently beneficial to justify its expensiveness; and stovarsol appeared to be inferior to emetine in acute amoebiasis although useful in more chronic cases. Experiments have shown that the value of rice-polishings as a source of vitamin B is greater than has been supposed, and that an extract of polishings—the method of preparation of which is fully described in the Report of the Chemical Laboratory—is almost as potent as the polishings themselves. The details of malignant tumours comprise 78 cases—6 in Malays, 42 in Chinese, and 30 in Tamils: attention is drawn to a case of epitheliomata on scrotum and right index finger in a Tamil who for three years had been engaged in anti-mosquito oiling. The existence of Weil's disease in Malaya has long been suspected, and at last the infective organism has been discovered. Further observations on Melioidosis show that the disease has a wider distribution than was suspected; and although from experiments local horses have been inferred to possess immunity to this disease, a case of natural infection was discovered this year in an Australian horse imported six months previously.

A. A.

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE. 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 321–326.

**Laboratory Meeting.**

Among interesting exhibits the following are suitable for brief description from a didactical standpoint:—

By Dr. P. A. BUXTON. Photographs showing Samoan villages (*a*) standing clear of vegetation and nearly free from filariasis, and (*b*) buried in vegetation and much afflicted with filariasis. Two rat-tailed maggots, by unimpeachable testimony passed alive by a patient. A dense fibroma containing nematodes, from a donkey in Samoa. Section of a nearly full-term placenta showing nearly all the maternal corpuscles infested with *Pl. malariae*, and all the foetal corpuscles free (shown for Mr. THEODOR, of Jerusalem).

Among " Mansoniana " shown by Dr. MANSON-BAHR was Sir Ronald Ross's original letter describing the full cycle of Proteosoma in Culex. By a happy coincidence specimens of *Anopheles maculipennis* infected with *Pl. vivax*, exhibited by Colonel JAMES, matched the figures by which the latter was illustrated.

By Dr. H. M. SHELLEY. Pictures of cases of pellagra illustrating signs and symptoms and beneficial effects of thyroid treatment (1 to 2½ gr. daily) of that disease; also a chart to show similarity between myxoedema and pellagra.

By Dr. A. C. STEVENSON. Sections of liver (*a*) from West African yellow fever and (*b*) from spirochaetosis icterohaemorrhagica were compared together to show their distinct histological difference; two sections of spleen from the first-named disease showed, respectively, degeneration of internal coat of arteries, and nodules of endothelium-like cells in the centre of a Malpighian corpuscle.

Among exhibits by Dr. J. Gordon THOMSON were sections showing stages in formation of " malarial granuloma " in brain.

Dr. C. M. WENYON and Dr. H. H. SCOTT showed, among other things, films of heart-blood illustrating the tendency of intestinal flagellates to invade the blood-stream before or after death—Hexamita in Algerian tortoise and Senegal chameleon, Trichomonas in demoiselle crane and stump-tail lizard, and *Selenomonas ruminantium* in Java mouse-deer being the flagellates seen in the films.

A. A.

## MISCELLANEOUS.

ACTON (Hugh W.). **Neurasthenia in the Tropics.**—*Indian Med. Gaz.* 1927. Jan. Vol. 62. No. 1. pp. 1–6.

In Major Acton's view the *exciting cause* of neurasthenia is a depression of the function of certain endocrine glands, mainly the thyroid and to a less extent the adrenals. This depression may be due to: (1) The direct action of the toxins of acute diseases, such as enteric fevers, cholera, plague, bacillary dysentery or of chronic diseases such as malaria, syphilis, hookworm infection; (2) interference with the digestive functions, brought about by toxins and by putrefactive changes in the gut; pyorrhoea and chronic dysentery produce such changes. The *predisposing causes* in the tropics are numerous. (1) The high atmospheric temperature and excess of humidity tax the body, for the skin requires a large quantity of blood to effect the reduction of the temperature by perspiration. Easterns rarely eat a meal during the heat of the day and wear suitable dress. (2) The tendency to production of anaemia from "lack of ventilation during the hot weather." (3) The poor quality of the food during the hot weather. (4) The inadaptability of the Indian cook to European methods of cooking; he uses capsicum and mustard oil which are stomach irritants, and makes all dishes as greasy as possible. (5) The fetish of exercise; strenuous games are played in the hottest period of the year.

The first effect of the combined predisposing and exciting causes is hypothyroidism; shown-by a feeling of chilliness, loss of condition of the hair, harsh skin. A similar depression in the activity of the adrenal medulla causes the sympathetic nervous system to work at a lower ebb; there is loss of tone in the whole involuntary muscular system—low pulse tension, dilatation of the stomach, constipation (from colon distension). The activity of the gonads is depressed as well. The functions of the parasympathetic glands are unaffected or may be stimulated—the anterior lobe of the pituitary, the prostate, the adrenal cortex. The amylase function of the pancreas is diminished, and the parathyroids depressed, especially in Europeans. The patient, not feeling up to the mark, becomes introspective and develops a visceral consciousness, which again leads to fear that heart disease or cancer is developing. He becomes morbidly anxious, thinks he is becoming sexually impotent; a woman, if married, may develop morbid fears about her child. Such patients show an excessive response to external stimuli, e.g., they fear to go alone into society. Depression of the higher mental functions comes on slowly; to lack of concentration succeeds a slow failure of memory.

The whole success of treatment depends on the forming of a complete diagnosis. The exciting and predisposing causes must be identified and removed by treatment, and then the after-effects, such as anaemia, endocrine deficiencies, loss of involuntary muscular tone dealt with, if necessary. If the cure is to be complete the physician must be able to deal with the patient's mental condition. Of the *exciting causes* among the acute diseases the author puts enteric fever first. Most of the neurasthenia in the tropics, however, is due to chronic disease of the alimentary canal, and it has to be remembered that in chronic colitis, whether bacterial or protozoal, there may be no tenesmus and no visible blood or pus in the stools, the only constant sign being the passage of mucus. When the colitis is amoebic and the stools are plated there is usually a large number of " fine lactose or non-lactose fermenting colonies of streptococci or yeasts as secondary infections." Treatment may be by alkalis (bism. carb. or sod. cit.) internally and emetine by the vein or the muscles, or by bismuth-emetine-iodide, or by a course of autogenous streptococcal vaccines, followed, when the gut flora is normal, by emetine and alkali as before. The author holds that the failure of emetine is due to acidity caused by the action of the streptococci. When the colitis is bacterial, there may be found on plating transparent non-lactose-fermenters of the dysentery group or opaque non-lactose fermenters of the paradysentery group ; sometimes it is necessary to fall back on the agglutination reactions. Treatment consists in regulating the diet as regards carbohydrates (not reducing its caloric value too much) and giving appropriate doses of vaccines of the causative agent and secondary invaders. Pyorrhoea, gastric and duodenal ulcers, appendicular inflammation may also have to be considered.

As to *removal* of the *predisposing causes*, a change to England or the hills, if it is possible, will be sufficient. Even when it is not possible a good deal can be done to eliminate them. Among after-effects which have to be treated two are specially considered—endocrine defects and loss of tone of the involuntary muscles. Those cases of neurasthenia that occur after acute diseases do extraordinarily well with endocrine therapy. Loss of muscular tone is combated by abdominal support or massage, liquid paraffin, and endocrine glands. Treatment must be continued for some months.

[It will be seen that this a practical paper full of detail. It will repay those who are able to do so to consult it in the original.]

A. G. B.

STANNUS (Hugh S.). **Tropical Neurasthenia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6. pp. 327–334.

After a discussion of the views of authorities on the psychoneuroses, the work of CRILE, and the action of light and heat on the human economy Dr. Stannus sums up as follows :—

" The difficulties of life met with in the tropics may be those commonly found in our own country, but they tend to take on an aggravated form midst the conditions which life in such surroundings entails, conditions associated with apprehension, or the emotion of fear.

" The special factor involved in Tropical Neurasthenia, it is suggested, is the summation of the multiple, minor, noxious, defence-inducing stimuli already alluded to.

" Both sets of conditions cause over-stimulation with exhaustion of the kinetic system for defence, a system whose links may be further injured by the common infections and toxaemias and by various climatic conditions occurring in many tropical countries.

" The factors, therefore, involved in the production of neurasthenia, may be multiple and varied. Prevention depends upon their recognition, on their correct interpretation, on understanding how they act, and in the first instance on correct selection of the men allowed to proceed to tropical countries."

Dr. Stannus notes that there is not a clear conception what should and should not be included under the term neurasthenia. It is essential to distinguish between this condition and the depressive state, for the depressive is always a potential suicide, whereas the neurasthenic, who likes to discuss his troubles, is not.

In the discussion which followed Dr. A. BALFOUR gave a useful summary of recent correspondence in the *British Medical Journal.*

A. G. B.

VAN LOON (F. H. G.). Het zenuwlijden der blanken in de tropen. **[Nerve Affections of Whites in the Tropics.]**—*Nederl. Tijdschr. v. Geneesk.* 1927. Apr. 9. 71st Year. 1st Half. No. 15. pp. 1874–1899.

Many European colonists return from the tropics with nervous complaints, and among these patients neurasthenics are very prevalent. Tropical neurasthenia differs widely from the common type. In causes and pathogeny, as well as in symptoms, exogenous and bodily factors preponderate. Hypersecretion of various organs is most pronounced (profuse sweating, rhinorrhoea, diarrhoea, polyuria), at first occurring under the influence of exogenous physical and psychical factors, later in more continuous and autonomic form. There is hypersensitivity to chilling, continual " colds " are common, nutrition is impaired in cases of long standing. The temperature, generally normal, may be slightly raised (low fever).

The author sums up as follows the exogenous causes of the condition : (1) The continual moist heat, with the high demands it makes on the heat regulating function of the nervous system ; (2) the long hours of abundant light ; (3) the shorter and lighter sleep in the tropics ; (4) irritation of the intestinal tract by the excessive use of spices ; (5) the numerous noxious influences of toxic and infectious character ; (6) the atmospheric electrical condition ; (7) the loneliness of many outposts ; (8) the monotony of the surrounding tropical nature ; (9) the lack of higher ideals and the materialistic conception of life of many colonists.

Therapeutical advice can be founded upon these views of the pathogeny. Regular leave either to mountainous districts or to Europe is very important. Many cases of tropical neurasthenia occur in people who in view of their character should never have been sent out to the tropics.

The neurasthenic condition may play a part in the causation of other tropical diseases, i.e., sprue.

Neurasthenia is rare in natives and was only met with in those who had more or less adopted European habits.

The article contains much stimulating speculation.

W. J. Bais.

NÄGELSBACH (E.). Die Operation der Elefantiasis scroti et penis. **[Operation for Elephantiasis of the Scrotum and Penis.]**—*Arch. f. Schiffs- u. Trop. -Hyg.* 1927. June. Vol. 31. No. 6. pp. 282–291. With 3 text figs. [6 refs.]

The author, who has acquired considerable experience of his subject in the course of two years' work with an American Mission in Western Abyssinia, deplores the fact that in German surgical text-books instructions with regard to the procedure called for in removing an elephantoid scrotum are either lacking or at best superficial. He accordingly describes for the guidance and benefit of surgeons proceeding to the tropics an operation which he himself has practised in 38 cases.

In the part of Abyssinia where Dr. Nägelsbach has worked elephantiasis is common, though the elevation is nearly 6,000 feet above sea-level and the climate temperate. The lower limbs and male genitalia are most frequently affected. Filariae are as little observed as blood-sucking Culicidae. The author has never found microfilariae in the blood of his patients, nor discovered parent worms in removed tissues. Filariasis is consequently excluded as an aetiological factor, but no alternative theory of causation is advanced. His operations appear to have been carried out under some difficulties, and for part of the time in the entire absence of skilled assistance. Local is preferred to general or spinal anaesthesia, and a half-per-cent. solution of novocain with adrenalin employed for the purpose. The rubber tourniquet is never used.

Rightly remarking that from the surgeon's point of view the size of the tumour is of less importance than the condition of the integuments at its base, the author nevertheless repudiates the axiom that incisions should be made through healthy skin only as unnecessary and often impracticable. His incisions, he informs us, are designed with the object of securing good " cosmetic " and functional results.

The operation commences with the formation of a rectangular flap some 8 to 10 cm. long on the upper and anterior aspect of the tumour, included between two vertical incisions over the cords and a cross cut above the level of the preputial orifice. This is carefully reflected and the penis, cords and testes then liberated in the usual way. From the lateral and posterior aspects of the neck of the tumour a rounded flap of healthy or diseased integuments is now fashioned, with its free edge strongly convex, extending if possible to a distance of four or five fingers' breadth from the anus. The tumour having been removed the anterior flap is used for enveloping the penis, its lower margin being stitched to any preputial lining that may have been preserved (often an insignificant quantity in patients of semitic origin), and its sides united in the same way on the under aspect of the organ over the urethra. The posterior flap is then adjusted as a pouch for the cords and testes by suitably applied clips and sutures. Every effort has of course been made to secure complete haemostasis. A glass or rubber drainage tube is inserted into one of the posterior angles of the wound, where it is allowed to remain for the first 48 hours.

None of the author's cases healed absolutely without suppuration, but there was never any serious complicating infection. Results are said to have been in every way satisfactory, and no reference being made to the subject of mortality it may be concluded that all the patients recovered. No information is furnished with regard to the weight or size of the tumours removed, but the only one of which an illustration is given was evidently of very large dimensions. The interesting fact is recorded that, contrary to the usual run of experience, in only one of the cases dealt with did the testes carry hydroceles.

J. J. Pratt.

HUDELO & RABUT. Les éléphantiasis de la vulve. [**Elephantiasis of the Vulva.**]—*Presse Méd.* 1927. Jan. 29. Vol. 35. No. 9. pp. 129–130.

The authors in a readable paper deal at moderate length with elephantoid conditions of the vulva, their aetiology, clinical characteristics, histology, diagnosis, and treatment. They recognize that elephantiasis is never a primary idiopathic condition, and that even in cases where the cause is unknown or unrecognized that cause has produced in the affected area a condition favourable to elephantoid changes. They premise an indispensable lymphatic stasis which may be in part mechanical, as exemplified in filarial cases or in those which follow a surgical glandular ablation, or may follow upon chronic fibrotic changes in the lymph channels and glands as a result of bacterial invasion. For practical purposes, and the authors claim that the paper is eminently a practical one, they classify cases of vulvar elephantiasis in four categories—filarial, strepto-staphylococcic, venereal, and tuberculous—admitting at the same time that such a classification is purely arbitrary and aetiological, and stipulating that only in very rare cases is the strepto-staphyloccocic infection absent as at least a secondary factor.

Elephantiasis of filarial origin is dismissed in a few words, being, perhaps, a condition of which the authors have no special experience; they note that its progress is accompanied by general symptoms, sometimes severe, which testify to microbic causative participation. Cases in which strepto-staphylococcic infection plays the chief or only part are explained by the special liability of the vulva to multiple and recurrent trauma, and the consequent creation of "portes d'entrée" for microbic invasion. Venereal affections may be the starting point of vulvar elephantisis, playing either an exclusive rôle or preparing the way for secondary infection. Blenorrhagia, chancroid, syphilis (more especially in the tertiary stage), and ulcerating granuloma may act in this way by the production of local changes and lesions eventually involving serious lymphatic impairment. Under the name of "diffuse hypertrophic syphiloma" FOURNIER has described a tumefaction in which he regards the specific agent as the sole factor. Tuberculous elephantiasis of the vulva may have for its starting point an ulcerous lesion (mixed infection), or be altogether independent of ulceration—a hypertrophic tuberculoma; this second type of case is rare, having as a matter of fact been recorded in only eight instances.

There is little or nothing new in the sections of the paper devoted to the clinical study, histology, and diagnosis of the affections considered. In the purely streptococcal cases treatment by vaccines and massage may be useful; in syphilitic cases specific medication is of course indicated; but in the immense majority of cases of all types treatment is almost exclusively surgical, curettings, cauterizations, and the laying open and scraping of fistulous tracks, when present, being resorted to before excisions on a large scale are undertaken.

J. J. Pratt.

RUKAWISCHNIKOFF (E.). Zur Biologie des *B. fusiformis* und der *Spirochaete Vincenti.* [**Biology of** *B. fusiformis* **and** *S. vincenti.*] —*Cent. f. Bakt.* I. Abt. Orig. 1926. Oct. 30. Vol. 100. No. 4-6. pp. 218–223. [18 refs.]

Studying the organisms in Vincent's angina the author arrives at the conclusion that there is a complicated life-history. Certain diplococcus-like elements commence the cycle, while the fusiform bacilli, spirochaetes and clumps of granules are developmental stages of these. The cycle may occur within or outside cysts, while resistant stages capable of renewing the cycle are described.

C. M. Wenyon.

ONORATO (R.). Sur le phagédénisme à symbiose spiro-bacillaire. [**Phagedaena due to Spiro-Bacillary Symbiosis.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 145–153.

Professor Onorato's views on this subject were given in this *Bulletin*, Vol. 20, p. 283; they are based on experience in Tripoli between 1912 and 1919. He names the condition phagedaenic symbiosis of Vincent and Le Dantec. The agents, which in his view are quite different organisms, are *Bacillus ledanteci*, which is peritrichal, very motile in vivo and more or less so in culture, and may by itself cause gangrene, and *Spirochaeta vincenti*. He rejects the name *B. fusiformis* as unsuitable (impropre). The spirochaete invades the tissues spreading into the intercellular spaces; the bacillus follows and kills the cells already damaged by the spirochaete. The affection is local, except when other organisms play a part; the B.–W. reaction is always negative. The phagedaenic ulcers produced are called active (florissant) or indolent according as the two agents or the bacillus alone are present; in the last instance the spirochaete has disappeared. The active ulcers are those which are spreading. The agents of the symbiosis are not found in the soil, but in the mouths of healthy as well as sick persons. The condition never develops on a healthy skin. The clinical manifestations of infection by the symbiosis are: the old hospital gangrene, phagedaenic ulcers, Plaut-Vincent angina, gangrenous stomatitis, noma, and spontaneous gangrene of the genital organs; other manifestations are some forms of pulpitis, foetid bronchitis, and enteritis. But there are other causes of most of these conditions. Prophylaxis consists in the hygienic care of the mouth and careful attention to skin lesions, however small. Treatment consists in careful cleansing of the ulcer and the topical application of arsenobenzol in glycerine, or salts of bismuth or iodoform, with attention to the general state and treatment of concomitant affections. [The paper deserves study in the original.]

A. G. B.

MÜLLER (H.) & VAN WAVEREN (W. F. J.). Over tuberculose van het strottenhoofd bij Javanen. [**On Laryngeal Tuberculosis in Javanese.**]—*Nederl. Tijdschr. v. Geneesk.* 1927. May 14. 71st Year. 1st Half. No. 20. pp. 2676–2682. [21 refs.]

The authors' conclusions are:—

(1) Laryngeal tuberculosis is about as frequent in Javanese as in European sufferers from pulmonary tuberculosis (about 30 per cent.).

(2) Contrary to European experience, the ulcerative (and not the hypertrophic) type of the affection predominates.

(3) Lupus of the throat, if occurring at all, is very rare.

(4) As in Europe, primary tuberculosis of the throat is very rare.

(5) The most frequently affected part of the throat in Javanese is the epiglottis (contrary to European experience).

(6) Affection of the cartilaginous parts of the throat, common in Europe, is rarely found in Javanese.

W. J. Bais.

YAMAZAKI (H.) & HOSOYA (Y.). Experimentelle Untersuchungen ueber die durch die sog. Malaria-mitteln verursachten pathologischen Veränderungen auf dem Oktavusgebiete. **[Experimental Investigations on Pathological Changes in the Peripheral Hearing Region, originating from Malarial Remedies.]**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 33–52. With 3 figs. on 1 plate.

There is nothing about malaria or hearing changes in this paper, which is a detailed pathological study of fine histological changes in the inner ear. Following KIRCHNER'S observations on quinine or salicylates as a cause of labyrinthine extravasation, and WITTNACK'S experiments on dogs where quinine caused a degenerative cochlear neuritis, succeeded by changes in the organ of Corti, and confirmed by later workers, LIND'S experiments using intravital staining in guineapigs, found that with good staining and well fixed specimens the results were always normal

Since the introduction of salvarsan treatment in syphilis a certain number of patients show unfortunate aural symptoms, which may be grouped as cochlear, vestibular, or mixed lesions. HAIKE came to the conclusion that the acoustic nerve was only indirectly affected, the results being due to spirochaetes locally, which without the salvarsan would ultimately have caused a neuritis. [This was the original explanation of EHRLICH concerning the 1 per cent. who showed aural symptoms after arsenical injections. He said that they had been insufficiently dosed.]

The authors have tested apes, dogs, cats, rabbits, and guineapigs, with various doses over different periods, using quinine, arsenic (Fowler's solution) and atoxyl and their derivatives. They detail fully the histological findings which in acute cases of rapid or massive poisoning were negative ; in prolonged cases (whilst a few were also negative) most showed localized degenerations of nerves and ganglion cells. A résumé states that :—

1. Given in certain doses stretched over sufficient time quinine, arsenic and their derivatives, have evil effects in the region of peripheral hearing
2. Whilst the intensity of the toxic symptoms and pathological changes essentially depend upon doses and duration, there are individual differences and there remains an impression that the distribution of the poison in the blood was not complete.
3. Blood effusion, inflammatory signs like round cell infiltration, exudations, and so on, were not found in the affected regions. On the other hand connective tissue changes and alterations in the carotid walls were noticed.
4. With quinine the cochlea was most affected, whilst with arsenic the vestibular nerves were most degenerated.
5. In advanced stages of poisoning obvious, pathological effects occurred not only in the cochlea but also in the vestibular and facial nerves.
6. The chief change in the affected nerves was segmental destruction of medullary sheaths, and degeneration of nerve fibres with swelling or shrivelling of ganglion cells, as well as the sensory cells of Corti's organ, the maculae and cristae.
7. A characteristic alteration of nerve bundles is such that they can be traced surprisingly through narrow channels, and in proximity to the ganglia and the periphery.

Whilst in the peripheral hearing organ the nerves and their endings were alone affected, in the brain and spinal cord and in the course of the eighth nerve there were slight changes in animals after two months of dosage, the ganglion cells shrivelling, their nuclei showing the fine structure abnormally clear. Deiter's Nucleus was only slightly affected in the quinine animals compared with the atoxyl ones.

[The demonstration of these local degenerations is valuable, as anything influencing hearing or especially orientation is becoming increasingly important. Even before actual organic changes, such affections may cause trouble, as in the case of motorists or aviators. HAAN has lately stated that the decreased sensitiveness of the otolithic reflex from oxygen want at great heights is probably the cause of the difficulties in steering and balancing which pilots notice.]

James Kerr.

PEARSON (George H.). **On the Use of Hypertonic Saline Injections in the Treatment of Acute Opium Poisoning.**—*China Med. Jl.* 1927. Jan. Vol. 41. No. 1. pp. 71-73.

This treatment was used for a patient who after vigorous therapy of the usual kind appeared to be moribund. She suffered from intestinal stasis caused by the ingestion of crude opium and could be saved only by a movement of the bowels, which the usual methods failed to effect. By the use of an extemporized apparatus 200-300 cc. of 20 per cent. salt solution was introduced into a vein when the previously comatose patient came to, vomited and had a vigorous bowel evacuation. The cure was completed by a further stomach wash-out and walking exercise. The author believes that in hypertonic saline the practitioners of China have a new weapon of great value in the treatment of moribund opium cases. [This treatment was suggested to the author by the perusal of a paper by Dr. J. W. Ross, " Hypertonic Saline in Adynamic Ileus " published in the *Canadian Med. Ass. Jl.* for September, 1926.]

A. G. B.

HOSHIZAKI (S.). **The Number of Blood Platelets in Haemorrhagic Small-Pox and their Significance in the Prognosis of this Disease.**—*Jl. Oriental Med.* 1926. Nov. Vol. 5. No. 5. English summary p. 65. [In Japanese.]

The author studying 10 cases of haemorrhagic smallpox found that the number of blood platelets diminished in the early stages, increased gradually on the appearance of pus and continued to do so for 1-2 months. It is concluded that the number of platelets forms a good basis for prognosis and the author states that when they number 100,000 or more the prognosis is good.

A. G. B.

PAYNE (George C.) & PAYNE (Florence King). **The Incidence of an Edema Disease among Children in the Republic of Haiti.**—*Amer. Jl. Hyg.* 1927. Jan. Vol. 7. No. 1. pp. 73-83. With 5 text figs. [9 refs.]

In 1924 MANN published an account of oedema disease among prisoners in Haiti [see this *Bulletin*, Vol. 22, p. 157]. The cases described in the present paper were seen among a rural population of 4,439 persons near Port au Prince, during a period of one year. Of 34 cases of marked oedema in children, 6 were associated with severe malaria, 2 with syphilis or yaws, and one with amoebic dysentery; in 25 cases no infection could be demonstrated and this group is called the idiopathic group. Among these 25 there were 11 deaths. The condition is widely recognized in Haiti as a cause of death in children. The table shows its age incidence; no case was seen in a nursing infant or in a child over five.

| Age in months. | Males. | Females. | Total. |
|---|---|---|---|
| 12 ... ... ... | — | 1 | 1 |
| 13–18 ... ... | 1 | 2 | 3 |
| 19–24 ... ... | 3 | 2 | 5 |
| 25–30 ... ... | 5 | 4 | 9 |
| 31–36 ... ... | — | 2 | 2 |
| More than 36 ... | 4 | 1 | 5 |
| Total ... ... | 13 | 12 | 25 |

Twenty-two were examined for the ova of intestinal parasites; one had ancylostomes, 8 ascarids and 6 trichurids. The early symptoms appeared to be emaciation and muscular weakness which might or might not be followed by general oedema. The post-oedematous stage resembled the pre-oedematous. It is noted that the peasant's diet probably never contains more than the bare minimum requirements of the accessory factors and these deficiencies are accentuated in the younger children. "The unfortunate child who has recently been weaned and has several older brothers and sisters is in no position to engage in the competition around the family cooking pots." His food is mainly starchy. There was no beriberi among the mothers, no evidence of cardiac dilatation or hypertrophy in the children, no evidence of neuritis or paralysis. The muscular weakness was due to defective nutrition of the muscles themselves rather than to nervous lesions. The treatment prescribed was milk, butter, green leaves, and ripe bananas, and under this régime one case described improved. The authors observe that great difficulty was experienced in gaining the peasants' confidence for examination and treatment. [There is no mention of anaemia or slow pulse.]

A. G. B.

CHAVES (J. Avelino). Therapeutica cirurgica do mal de engasgo. [**Surgical Treatment of Mal de Engasgo.**]—*Brasil-Medico.* 1927. Jan. 15. Vol. 41. No. 3. pp. 43–51. With 7 text figs.

The first half of this article gives an account of the peculiar condition, going by the names of cardio-spasm, spasmodic dysphagia, oesophagismus, convulsive angina, amongst others, and considers its aetiology and symptoms, points which have already been reviewed in this *Bulletin* [Vol. 18, p. 301].

The author is a supporter of the infective theory of the causation of the disease, because of its epidemic prevalence in Brazil, the enlargement of the spleen and local glandular swelling. The case of a soldier, aged 23 years, is detailed. This patient had suffered for about three years; for the first two he experienced intermittently difficulty in swallowing, having to follow each mouthful by a draught of water and often regurgitating both, though by standing up he could sometimes force the bolus down into his stomach. During the last year, however, practically everything he took was returned, till life became a burden and he applied for treatment.

The operation is described and consists in exposing the lower part of the oesophagus by a median incision below the xiphisternum, and dividing the circular muscle of the oesophagus down to the mucosa, twisting the oesophagus round and making another similar incision parallel to the first, through the part constricted. On the third day fluids are allowed by mouth, and on the fourth a purée of broth and tapioca, and gradually increase to solid food is permitted. The results are said to be most satisfactory. The illustrations are not very clear; the two line-drawings which best show the condition have unfortunately been reproduced upside-down.

H. Harold Scott.

MAYER (Martin), BORCHARDT (Werner) & KIKUTH (Walter). Chemotherapeutische Studien bei der "infektiösen Anämie der Ratten." "Therapia sterilisans" mit den Arsenobenzolen Salvarsan und Arsalyt. [**Chemotherapeutic Studies on the Infectious Anaemia of Rats. Therapia sterilisans by the Arsenobenzols, Salvarsan and Arsalyt.**]—*Deut. Med. Woch.* 1927. Jan. 1. Vol. 53. No. 1. pp. 9–10. [11 refs.]

The authors have described a parasite of blood cells found in rats after removal of the spleen which produces pernicious anaemia. The human interest of the present paper is that these parasites are considered to be a species of Bartonella, the parasite of Oroya fever, and that a moderate dose of salvarsan or arsalyt is promptly curative, suggesting that these drugs may be curative also in that fatal fever of man. They have cultivated their *Bartonella muris ratti* on Noguchi's medium and have transferred it from spleenless rat to spleenless rat. In fact, all Robert KOCH's postulates have been fulfilled for this parasite. In treatment by salvarsan or arsalyt, whereas 50 per cent. of the untreated spleenless animals died, those which received at the height of the anaemia either subcutaneously or per os small doses of these substances all recovered and the parasites disappeared within 24 hours. Similarly, a small dose prevented infection and the effect of it lasted a month. Other drugs were useless either in curative or prophylactic action. Many points are left uncertain but a further detailed communication is promised.

A. G. B.

HAWLEY (Paul R.). **Hill Diarrhoea.**—*Milit. Surgeon.* 1927. Feb. Vol. 60. No. 2. pp. 140–145. [3 refs.]

Under the names hill diarrhoea, non-specific diarrhoea and Baguio diarrhoea this disease has been known in the Philippines since the American occupation. It occurs most frequently in Baguio at 5,000 feet elevation and also occasionally in the lowlands, in Europeans, seldom in natives. The hot season of 1926 was exceptionally severe.

After two months came a typhoon and the temperature at Manila dropped 15° to 20° F., with rain and chilly winds. Promptly hill diarrhoea appeared and within 2 weeks there were hundreds of cases, in both old timers and new comers. The symptoms were progressive anorexia and gastric indigestion, rapid loss of weight, abdominal discomfort, and frequently complaint was elicited of an irritating ache over the liver area or in the region of the right scapula. The Philippines treatment comprises castor oil, rest in bed, carbohydrate diet, bismuth subnitrate, calcium lactate and a stomachic. The author believes that astringents are unnecessary and bismuth harmful. The following treatment he has found effective even in persistent cases :—

> " Sodium phosphate (2·0 to 3·0) is taken in a glass of hot water one-half hour before breakfast. This usually results in one thorough evacuation after breakfast with a feeling of relief and no further stools during the day. If the gastric indigestion is annoying, it may be relieved by ten to fifteen drops of dilute hydrochloric acid after meals. A preliminary purge with castor oil may be indicated if the condition has persisted for several days before the patient has come under treatment.
>
> " Fats, fatty meats of all kinds and especially pork, and all highly seasoned foods should be eliminated from the diet until convalescence is well established. Lean steak, lamb chops, boiled vegetables, toast and tea or coffee may be taken in moderation. All mixed drinks and beer are contra-indicated ; but whisky, with or without soda, in small quantities taken infrequently appears to do no harm and does relieve the weakness. With this treatment, rest in bed is not necessary—certainly not after the first twenty-four hours in any but unusually severe cases. The patient must, however, forgo all late parties and spend nine or ten hours in bed every night. Moderate exercise, such as golf, is beneficial after the first day or two. Under this régime improvement is usually marked within forty-eight hours and the average case is convalescent within four or five days."

As to the etiology Major Hawley says that unquestionably there is no specific causative organism. The absence of bile from the stools, or its decided decrease, is constant and explains most of the symptoms. Fats are not digested and proteins imperfectly. The liver pains point to that organ as at fault. A quotation is given from " Manson's Tropical Diseases " describing the life of the average European in the tropics and its physiological effects on the liver, with the production of hepatic hyperaemia and proneness to inflammation on slight causes, such as chill. In every case of hill diarrhoea at Manila there was a history of chilling just before the onset, after exercise, or sleeping without covering in a draught or the blast of an electric fan. Warm clothing is essential to the treatment of these cases, and the author has a good word to say for the " cholera belt." Hill diarrhoea, then, is a mild hepatitis excited by chill in a person predisposed to hepatic congestion, and prevention consists in the avoidance of such congestion by exercise, moderation in diet, especially consumption of alcohol, and an occasional dose of a saline cholagogue. The term " hill diarrhoea " is a misnomer. The effect of altitude is merely that of temperature.

The editor adds an extract from a letter received from Major Hawley, from which it appears that he himself recovered on the treatment outlined above after 3 weeks of the usual treatment and loss of 18 lbs. weight, that other sufferers tried it with happy results and that though Major Hawley was doing administrative work his reputation spread till he had " a regular clinic of hill diarrhoea."

A. G. B.

YOUNG (W. A.). **Unusual Case of Aortic Aneurism.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 478–479. [2 refs.]

The case of a messenger [it must be presumed a native] who died suddenly after cycling. The macroscopic findings are described. Histological examination showed typical syphilitic aortitis. Such affection of the vascular system is not uncommon on the Gold Coast [see this *Bulletin*, Vol. 22, p. 982], where hard chancres are rarely seen and secondaries are often "skipped." The possibility is mooted of such symptoms being attributable to yaws.

A. G. B.

ORSINI (Olyntho) & MACHADO (Lucas). Um caso de esthiomeno. [**A Case of Chronic Ulceration of the Vulva.**]—*Brasil-Medico.* 1927. Feb. 12. Vol. 41. No. 7. pp. 135–137. With 1 text fig.

This condition appears to be distinct from tuberculosis, syphilis, epithelioma, soft sore, or ulcerating granuloma of the pudenda. The patient had been a prostitute for many years, and the present condition began as an ulcer of the vulva nearly two years ago. This extended and the adjacent tissues became oedematous. There was a sensation of pain and heat, and some difficulty in micturition. Slight benefit resulted from an operation [the nature of which is not stated] but subsequently the ulcer increased again in size. The general condition was good. The ulcer was in parts phagedaenic, with sinuses and surrounding hyperplasia.

Antisyphilitic treatment with bismuth, mercury, and neosalvarsan at first gave benefit, but during the last three months there had been no change, though the Wassermann reaction was negative.

H. Harold Scott.

TANON (Louis) & JAMOT (E.). Une maladie des noirs de l'Afrique équatoriale : le lambo. [**Lambo. A Disease of Negroes in Tropical Africa.**]—*Bull. Méd.* 1926. July 31. Vol. 40. No. 32. pp. 900–902. [1 ref.]

This disease, which is not new, is a myositis attributed to staphylococci and was observed during the war in Cameroon and Ubangui; the Bandas of the last-named region call it "lambo." LAIGRET and LEFROU (1922) have published a good account of it [see this *Bulletin*, Vol. 20, p. 28] and the authors make several references to their paper. The same disease has been described from Indo-China but the authors join issue with CASTELLANI when he makes it equivalent to muma fever of the Samoans and bungpappa of the Gold Coast, for they have never found filariae. There is a tendency to multiplicity of foci with suppuration in several muscles in succession. In their cases the buttock was the most usual site. They have found staphylococci in twelve cases and no other organism. They suggest that the disease results from the infection of a deep haematoma or contusion by a microbe circulating in the blood, but have not been able to verify this hypothesis. Surgical treatment has in their hands proved effective.

A. G. B.

NICOLAS (Ch.). A propos du Lambo. [**A Note on Lambo.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 4–6.

Lambo is described by TANON and JAMOT as a disease of negroes in Equatorial Africa. The author has observed what he considers to be the same disease in New Caledonia in the white and yellow races as well as in natives of the island. He describes two cases: (1) A woman with a deep-seated swelling of 3 weeks' duration, no fever and little general disturbance; the swelling increased till it was incised a fortnight later with the exit of creamy pus, in which a staphylococcus was found; the abscess healed without drainage; (2) a swelling primarily of the right buttock following a boil, then of the right side of trunk generally, with temperature over 40°; the author gave two injections of Propidon (DELBET) and the swelling in a few days disappeared. The author thinks that this disease is one of climate rather than race and is due to a staphylococcus. There is little fever and no pain. In every case but the one cited incision was called for.

A. G. B.

PARODI (Silvio E.). El *Rhinosporidium Seeberi* en nuestro país. [*Rhinosporidium seeberi* **in Buenos Aires.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 492–510. With 19 figs. [10 refs.]

A man, 19 years of age, for a year experienced difficulty in breathing, especially during sleep, when he had to breathe with his mouth open. A pedunculated polypoid papillomatous tumour, the size of a cherry, of the left lower turbinate was found and removed. Examination revealed the fact that it was due to *Rhinosporidium seeberi.*

The remainder of the paper is devoted to a detailed description of the parasite and the histological changes induced. The author confirms in all points the work of ASHWORTH.

H. Harold Scott.

MALAGUETA (I.) & SAMPAIO (Oséas). Syphilis hepato-peritoneal com esplenomegalia palustre. [**Syphilitic Hepatitis with Ascites, accompanied by Malarial Splenomegaly.**]—*Arch. Brasileiros de Med.* 1927. Jan. Vol. 17. No. 1. pp. 1–8.

An interesting case is recorded. A man of 40 years, who denied alcoholic indulgence or venereal disease but had had malaria, suffered from diarrhoea for three months, passing latterly mucus with much tenesmus. The abdomen then became enlarged and, when examined at hospital, was tense all over, but a tumour could be made out in the left hypochondrium. 5,300 cc. of yellowish ascitic fluid were removed and the tumour was found to be the spleen; the liver could not be felt and by percussion was not enlarged. The serum gave a positive Wassermann reaction (++) and the ascitic fluid a stronger reaction (+++). Between March 31st and May 23rd he was tapped six times, and, in all, 49 litres of fluid were removed, on the last occasion 11 litres. On June 1st antisyphilitic treatment was begun. Five days afterwards 8 litres were taken away and 6½ litres later. The symptoms then improved and the fluid did not re-accumulate.

The authors discuss shortly the diagnosis. They do not consider that the hepatic condition was polylobular cirrhosis, but a chronic perihepatitis and peritonitis due to syphilis, and the enlargement of the spleen to be malarial. [The latter diagnosis was apparently made on the patient's statement; there is no confirmation of it in the account given of the physical and blood-examination.]

H. Harold Scott.

LODATO (Gasparc). Cinque casi di foruncolosi curati con l'autopioterapia. [**Five Cases of Furunculosis treated by Autotherapy.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Jan. Vol. 8. No. 1. pp. 35–37.

The material for treatment was obtained by emulsifying a fair-sized drop (una buona goccia) from a pustule in 5 cc. of a " carbolic acid solution made up for hypodermic use."

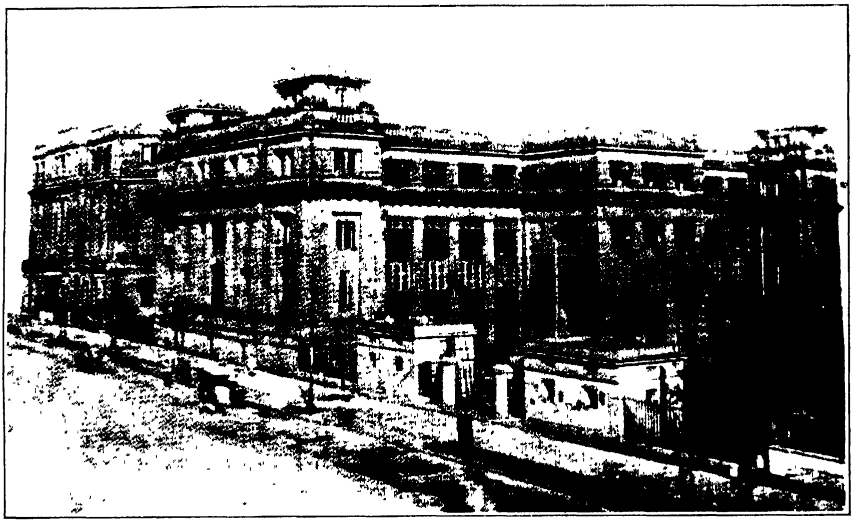
After being left for a few days, 1 cc. was injected hypodermically on alternate days; 12 18 injections were given. The initial dose caused rise of temperature in one patient, vague discomfort and pruritus in a second, no adverse symptoms in the others, and the results are recorded as very good; in the one case where time is mentioned there has been no recurrence of the boils during the 8 months which have elapsed since the injections.

H. Harold Scott.

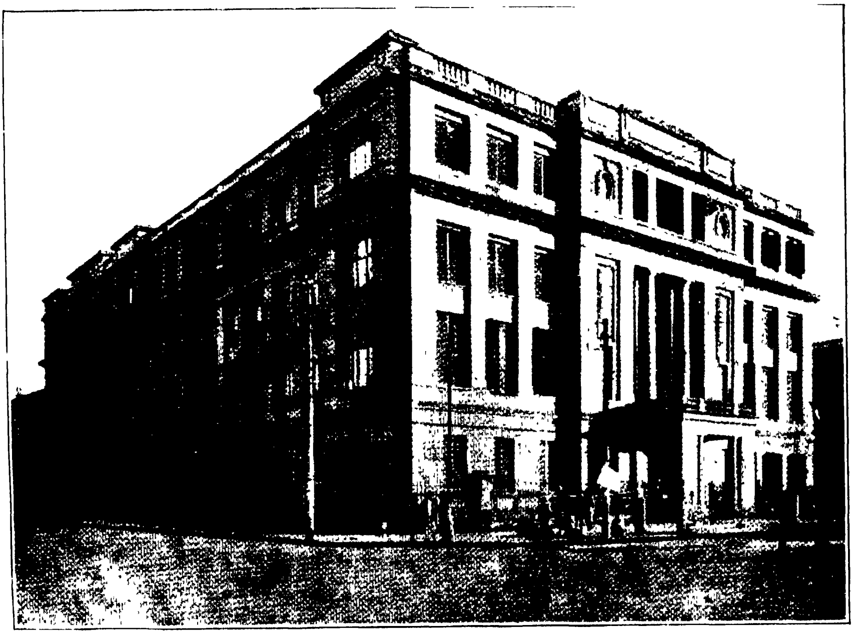
The Leyden Institute of Tropical Medicine.
[Reproduced from *Acta Leidensia*, Vol. I.]

FLU (P. C.). **The Leyden Institute of Tropical Medicine.**—*Acta Leidensia.* 1926. Vol. 1. pp. 1–9. With 14 plates.

The Leyden Institute of Tropical Medicine and Laboratory for the Professor of Tropical Medicine at the Leyden University are housed in an old mansion of the 16th and 17th centuries, which had to undergo extensive alterations. The illustration shows the unchanged façade.



The Carmichael Hospital for Tropical Diseases, Calcutta



The School of Tropical Medicine, Calcutta.

[Reproduced from the *Annual Report of the Calcutta School of Tropical Medicine for 1926*.]

It is divided into three departments which are here described. A number of photographic plates show the internal arrangements. Some 12 patients can be accommodated in the wards. The Director is Professor of Tropical Hygiene.

A. G. B.

CALCUTTA. **Annual Report of the Calcutta School of Tropical Medicine, Institute of Hygiene and the Carmichael Hospital for Tropical Diseases 1926.** [MEGAW (J. W. D.), Director.] **Also a Brief History of the School and a Report for the Years 1920-1925.**—pp. iv+152. With 28 plates (1 coloured) & 1 chart. 1927. Calcutta: Bengal Govt. Press. [For Official Use only.]

This is something more than an annual report, since it includes a history of the School from its inception and a review of the first five years of its active work.

" There is a tide in the affairs of men which taken at the flood leads on to fortune " ; but no such tide was moving when, in 1910, Major Leonard ROGERS (as he then was) launched his proposal for the formation of a school of tropical medicine for Bengal. That was in the days when medical establishments in India were still ruled and overshadowed by state secretariats not very much awake to the importance of natural science, who held the belief that the habits and methods of observation necessary to the investigation of natural phenomena can be imparted in courses of lectures—a belief not yet uprooted in official circles. So in reply to ROGERS' proposal, which was warmly backed by the Director-General of the Indian Medical Service, the local Government gave a comfortable drowsy consent—classes in tropical medicine might be instituted in the Calcutta Medical College, under the tutelage of the Professors of the College "in addition to their own duties." ROGERS, however, had a real school of tropical medicine in mind, not a foolscap-paper school—a real school, with laboratories and hospital, a life and soul of its own, and an open atmosphere of observation and research. So, settling down to work with the intrepid resolution of Ajax, the address of Ulysses, and the patience of Job, and securing step by step the support of the Director-General of the I.M.S. (Sir Pardey LUKIS), the Indian Research Association, and (above all) the powerful mercantile community of Calcutta and the enterprising milling and mining and planting fraternities of Bengal, in the course of ten years he saw his dream realized.

The finished object of his achievement includes: (1) A School of Tropical Medicine with 6 professors and their several assistants; (2) a Tropical Diseases Hospital (the Carmichael Hospital, of more than 100 beds), the entire cost and equipment of which was raised by public subscription; (3) a Research Section with an Endowment (subscribed very largely by the commercial community of Bengal) of nearly £140,000, calculated to maintain 7 whole-time investigators and their assistants; and (4) an Institute of Hygiene with 3 professors and assistants. Its later adjuncts include a Pasteur (antirabic) Institute, and an electrotherapeutic department.

How the object was achieved—the local disputes and obstructions, the larger financial difficulties, and, on the other hand, the ever-present help of the Indian Research Association and the overflowing generosity of the local public—is here recorded in full detail.

Those parts of the Report dealing with the scientific work carried on in the School in the first five years of its existence 1921-1925 have been reviewed in this *Bulletin* from time to time and, being now quite familiar and in some cases famous, need not detain us.

The Annual Report for 1926 contains reports from 9 professors, 6 whole-time researchers, and the 2 adjunct departments. These again, outside " the trivial round, the common task " of each returning day, are for the most part the official record of work that has been communicated to the public during the year, and if not already noticed, is due for notice in the appropriate sections of this *Bulletin*. The principal subjects investigated by the professors during the year are Tick typhus ; the long neglected subject of skin-diseases ; intestinal protozoa and their associations, Leishmania infections, the endocrine relations of protozoon infections, and streptothrix infections in rat-bite fever ; the pharmacology of antimony derivatives and of carbon tetrachloride, the deterioration of digitalis in the tropics, the deleterious effects of potable spirits, drug addiction, and the chemistry and pharmacology of certain indigenous Indian drugs ; blood-grouping, and serum reactions in leprosy, rat-leprosy, and syphilis ; antimalaria and antimosquito studies, and a census of Calcutta rat-fleas ; water-purification, efficiency of filters, the food-value of the *Singhara* nut (*Trapa bispinosa*), and standards in *ghi* analysis.

Among the devices for facilitating study mentioned by the Director we note with pardonable gratification that " a résumé of recent work on each of the sections of tropical medicine has been made available for the students and staff by the simple plan of dissecting two copies of the *Tropical Diseases Bulletin* and bringing together the abstracts which deal with each subject. These are kept in files which are always available for reference." For us indeed *laborum dulce lenimen*.

In the Special Research Section (financed from the Endowment Fund raised largely by public subscription supplemented by annual grants from the Indian Research Association, and also from several Industrial Associations) important investigations have been continued during 1926 in kala azar, on the breeding of sandflies, and on kala azar therapy; on the epidemiology and mass diagnosis and the treatment of hookworm and the biology of the hookworm larva ; on the endemiology and epidemiology of cholera ; on the causes influencing the incidence and range of leprosy ; on the varying susceptibility of different breeds of rabbits to insulin ; on the geographical distribution of filariasis, on concurrent septic infections in filariasis, and on the action of chemicals *in vitro* upon filaria embryos—a worthy record.

A. Alcock.

CALCUTTA. **All-India Conference of Medical Research Workers held at Calcutta on 15th to 17th December 1925.**—43 pp. 1926. Delhi : Govt. of India Press.

The Conference was attended by 38 delegates representing all parts of India. A great diversity of researches in progress was discussed ; the varied items are here classed under forty-two headings, and they run through all the gamut of tropical disease. In addition to the many researches now under way the Congress approved one on skin-diseases, on the representation of Major ACTON, who instanced the opportunities afforded by his large out-patient department in Calcutta for studying the suspected relation between certain skin-diseases and intestinal intoxication. Colonel CHRISTOPHERS' scheme for the establishment of permanent machinery for the prevention of malaria was, perhaps, the principal subject of original discussion. The scheme, which is described in an appendix, postulates a permanent staff, consisting of a Director and Assistant Director, an Entomologist, two officers for Field Research, and in each case the necessary and respective subordinates, and also including an advisory Malaria Engineer; a Central Bureau, including a Library, a small Museum, a room for reserve and study collections of insects, and at least two laboratories; and a properly equipped Field Experiment Station. Working in collaboration with this Central organization there would be, in each Province, at least one efficient malariologist with all the necessary outfit, provided by the local government of the Province. The scheme was approved in a formal resolution. Among questions of domestic interest discussed was that of disseminating more widely the results of original work done in India; a pointed illustration of the pertinence of this question was given, and relevant action was taken in a formal recommendation that to facilitate distribution a reduction might be made in the price of authors' copies of reprints from the *Indian Journal of Medical Research.* [It does not seem to have occurred to any delegate to refer to the services rendered by this *Bulletin* in the timely diffusion of the published results of Indian Medical Research. But virtue is ever its own reward.] Another question of domestic concern is that " lack of sufficient first-class research workers " in the country is even now impeding progress, so much so that the Conference formally recommend recruitment for the Research Department in the open market. The Conference appears to have strayed across the political boundary in recommending the Scientific Advisory Board to urge the Government of India to invite the Rockefeller Foundation " to make a survey of medical education and research in India."

A. A.

MEGAW (J. W. D.). **Address.**—*Proc. Assam Branch Brit. Med. Assoc. Annual Meeting, Silchar, 1st and 2nd March, 1926.* pp. 47–55.

An interesting address from the Director of the School of Tropical Medicine, Calcutta, in which he touches in turn antimalarial work, kala azar, dengue and sandfly fever, tick typhus and epidemic dropsy and beriberi. Of dengue and sandfly fever he suggests that the two diseases should be classed provisionally in one group and called " Sand Fly Dengue " and " Mosquito Dengue."

A. G. B.

BALFOUR (Andrew). **Some Tropical Lacunae.**—*Jl. Trop. Med. & Hyg.* 1927. Apr. 16. Vol. 30. No. 8. pp. 97–106. [73 refs.]

A lecture which Dr. Balfour delivered at " the Universities of Leiden, Utrecht and Amsterdam " in March, 1927. The mention of some of the topics discussed will indicate its scope: Acclimatization of the white man in the tropics; tropical neurasthenia; native dietaries as predisposing causes of disease; bacteriological analysis of water in the tropics; clothing for Europeans in the tropics. Nature of the malaria toxin; causation of blackwater fever and the salivary secretion of biting insects; several problems in the life history of the malaria parasite; the virus of dengue; yellow fever; filariasis; tropical typhus; treatment of plague; life cycle of the relapsing fever spirochaete; leishmaniasis; trypanosomiasis; beriberi; pellagra; sprue; splenic abscess.

The discussion of these lacunae stimulates thought and the long list of references enables the reader to follow up any line which appeals to him. It may be noted that apart from leishmaniasis and other causes of splenomegaly Dr. Balfour does not think that the enlarged spleen is an exact guide to the prevalence of malaria in a community and he draws attention to the fact that NOGUCHI's leptospira is by no means established as the agent of yellow fever.

A. G. B.

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VALENZUELA (A. J.). Die Republik Ecuador und ihre Pathologie. [**The Pathology of the Republic of Ecuador.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Jan. Vol. 31. No. 1. pp. 13–20.

Ecuador is not excessively hot partly because of the Humboldt or Peruvian current and partly because of the high chain of the Andes not far from the coast. The climate is therefore varied: on the coast and to the east of the Andes the vegetation is tropical and the temperature in the hot months reaches 30° C. (86° F.); in the valleys of the Andes the average temperature is 10–12° C. It follows that the pathology is varied. A large number of diseases and disease conditions is mentioned, without figures. It will be convenient to note first what is absent. The diseases recorded as not found are—kala azar, verruga and Oroya fever, rat-bite fever, cholera, undulant fever, rabies, filariasis, bilharziasis, actinomycosis. Malaria occurs on the whole coast and in some of the deepest valleys; in the winter months it becomes epidemic. Tertian is the most frequent of the three forms. Blackwater fever is recorded. The author notes that *Cinchona succirubra* comes not from Peru as is usually believed, but from Loja in the south of Ecuador. American trypanosomiasis is found in certain coast places and in the east but is rare compared with its frequency in other South American lands. [KRAUS has shown that as far as records go this disease is common nowhere in South America.] Dermal leishmaniasis is found in the warmer parts; it requires further investigation. Yaws has been known since the time of the Spanish conquest, especially in the warmer regions; syphilis is also prevalent. Yellow fever has occurred at longer or shorter intervals since 1740. It was last introduced in 1902 and maintained itself till it was banished by sanitation. It was in Guayaquil that NOGUCHI (1918) discovered its supposed agent, *Leptospira icteroides*. Weil's disease "doubtless" occurs in Guayaquil; *L. icterohaemorrhagiae* was here found in rats. Dengue occurs from time to time. Smallpox has been practically banished by vaccination. Scarlet fever and measles occur epidemically over the whole country, but are far more serious in the Andes region than elsewhere. Whooping-cough heads the list as a cause of child mortality. Typhoid and paratyphoid are everywhere prevalent; typhus in the Andes zone. The great influenza epidemics visited Ecuador, but were not so lethal as in Europe. Bubonic plague was introduced in 1908, and reached all places on the coast and some inland; it still lurks in Guayaquil and other less important places. Diphtheria is prevalent but milder than in other lands. Anthrax is seen in the coast provinces in man and beast. Tuberculosis is general. Tetanus is widespread especially in the country regions. Leprosy, introduced by the Spaniards, is general but less frequent in the mountain regions. Dysentery is seen everywhere, especially on the coast, both bacillary and amoebic; liver abscess is more frequent in the mountains than elsewhere. Ankylostomiasis is serious, especially on the coast; other prevalent worms are Ascaris and Trichocephalus, *Hymenolepis nana, Taenia solium* and Bothriocephalus. Cysticerci are seen in brain and muscles. *Paragonimus westermanii* occurs in two of the coast provinces. Myiasis is produced by two flies, *Chrysomyia macellaria* and *Dermatobia cyaniventris,* and probably other species. Chigger ulcerations are common and another form which is neither leishmanial, framboesial, nor syphilitic, and is possibly a form of sporotrichosis. Sprue is seen, but not often. Dermatomycoses are frequent, as well as dermatitis bullosa plantaris and an affection commonly known as "miado de hormiga or de grillo." Polyneuritis [the word printed is Polyarthritis] is frequent and is attributed to malaria, alcohol, and especially beriberi. Pellagra is seldom seen. For further detail the paper must be consulted.

A. G. B.

MAGLI (Pietro). Brevi notizie nosografiche sull' Oltre Giuba Italiano (zona di Afmuadù). [**Notes on the Diseases of Trans-Jubaland.**]—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Jan. Vol. 8. No. 1. pp. 29–32.

Brief notes on the diseases prevalent in the Afmuadù district. For so small a population their ailments are many. Malaria comes first, prevailing from March to June and from November to January. Subtertian is the most common and pernicious forms not infrequent; blackwater fever was not encountered. The common mosquitoes are *A. costalis* and *A. funestus, Aëdes egypti* and *Culex fatigans,* together with numerous Theobaldia. Syphilis is very widespread; yaws also but less than on the coast. Dysentery is common, as would be expected in a place where the water for drinking is used also for animals and for the natives to bathe in. Pulmonary tuberculosis is more prevalent than is generally believed. Relapsing fever "cannot be excluded," though the author has not himself seen a case there. Tropical ulcer and phagedaenic ulcer are fairly common, and several cases of Madura foot and cutaneous fungoid diseases were met with. Of helminthic affections elephantiasis and infestations with Ascaris, Trichuris, *Hymenolepis nana* and *Taenia saginata,* but not ankylostomiasis nor schistosomiasis.

Bites by snakes (*Naja nigricollis* and *N. sputatrix,* and various species of Zamenis) and by spiders and scorpions are not infrequent. "These were regarded always as unimportant injuries."

H. Harold Scott.

PROCTER (R. A. W.). **Medical Work in a Native Reserve.**—*Kenya Med. Jl.* 1927. Jan. Vol. 3. No. 10. pp. 284–289.

The Native Reserve in question, under the medical care of Fort Hall in the Kikuyu Province, covers an area of about 3,000 square miles, and has a population of nearly half-a-million. Until this year there has been one Medical Officer who could devote only a part of his time to work in the reserve; there is now a second. A hospital exists at

Fort Hall and 12 dispensaries in outlying districts staffed by native dressers who give bismuth injections for yaws and treat ulcers and minor ailments. They are visited as often as possible by the M.O., but some get only a monthly inspection, and it is noted that the present type of dresser is of little use unless he is closely supervised. An account is given of the native beliefs and the ways of the medicine man, which shows that it is difficult for the native to appreciate the methods of the European doctor, and the need for a knowledge of native customs by the hygienist is shown by the statement that a native may not mix his stool with that of another person, for should he do so it will cost him a goat to obtain purification, so that he has a natural prejudice against using a latrine. The mutilation of the sexual parts of girls at about the age of 12 with its resulting deformity is undoubtedly one of the causes of the high maternal and infantile mortality amongst the Kikuyus.

There is not much about disease. Adults and adolescents suffer from what resembles Egyptian splenomegaly, the chief features of which are an enlarged spleen of stony hardness and an irregular temperature. Quinine is without effect and puncture of spleen and liver has not revealed leishmania. Of another disease the account is admittedly vague ; it occurs in quite young children " of an extraordinary light colour " with swelling of the feet and a history of slimy motions. The pallor increases and " the pigment seems to be concentrated into a curious black desquamation which is most noticeable on the arms and legs." It is usually seen at dispensaries, rarely at the hospital, and is nearly always fatal.

A. G. B.

LEFROU (G.). Contribution à l'étude de l'utilisation de la main-d'oeuvre indigène. Considérations médicales sur le personnel des chantiers de construction du chemin de fer Congo-Océan. [**The Utilization of Native Labour in the Construction of the Congo-Ocean Railway. Medical Considerations.**]—*Ann. de Méd. et de Pharm. Colon.* 1927. Jan.–Feb.–Mar. Vol. 25. No. 1. pp. 5–51. [4 refs.]

Since the Congo ceases to be navigable below 400 kilos from the sea a railway was needed to bring inland products to the coast ; the selected termini were Brazzaville and Pointe-Noire, the total length of line being 520 kilos. The author is concerned with the coast section, a very humid and hot district. The population of the district traversed is 70,000, and in the first year, 1924, all labour was recruited in the neighbourhood. In 1925, other districts were called on to furnish contingents, 4,000 out of a total 6,400, and some of these had a two months' journey to reach the scene of their work. An account is given of the chief diseases affecting the labour force and the dietary arrangements. During 1925 bacillary dysentery, of which previous epidemics had occurred here, caused 30 per cent. of the deaths, but it is noted that whereas among the local natives the dysentery mortality was 0·5 per cent. among the introduced natives it was 5 to 8 per cent. Attempts were made to check the disease by administration of vaccines —anatoxin of Dumas and entero-vaccines, but without success, a failure which is attributed to the massive contagion and the poor resistance of the victims. The best results in treatment were obtained with calomel.

There were 765 cases and 411 deaths. Next in importance came lung affections due to the pneumococcus, causing 18 per cent. of the total mortality; the case fatality varied from 52 to 65 per cent. The cases were most numerous at the change of seasons; vaccination was tried here with results which are as yet uncertain. The third place was taken by beriberi and malnutrition (misère physiologique) causing 13 per cent of the total mortality. In 1926, among an average effective of 3,000 men between January and May, there were 374 cases of beriberi and 105 deaths. At this time the carbohydrate fraction of the ration was one-third manioc and two-thirds rice and the protein fraction smoked meat or fish. The beriberi was of the oedematous form; polyneuritis was very rare; cases improved rapidly in hospital when ground nut and cod-liver oil were given. Many persons complained of failure of vision, which is attributed to lack of fat-soluble vitamins. Details are given of the constitution of the ration and of the efforts to improve it, but it is clear that the methods employed were faulty. (1) The food was distributed twice a week, and on each occasion the natives ate as much as they could the first day. (2) Owing to waste in several directions the full amount never reached the recipients. (3) Owing to the difficulty in providing food the quantities delivered were much below the scale. (4) The preparation of the food was faulty; the manioc was often cooked whole instead of first being ground to flour.

Much disability was caused by ulcers of the legs which caused 18 per cent. of the total morbidity; the smallest lesion often became the site of a tropical ulcer.

The author points out that native workmen should receive each a cooked ration and that its preparation should be superintended by a European; it appears that he advised this course but his advice was not followed by the administration, which also was unable to give effect to the recommendation, which the author stresses, that mixtures of races in one camp should be avoided. Other points dealt with concern the recruiting of labour and the period of its engagement; since most of the losses occurred in the first 6 months it is suggested that when practicable imported natives should be engaged for 18 rather than 12 months.

A. G. B.

DA COSTA (Peregrino). Epidémiologie de Macao. [**Epidemiology of Macao.**]—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 1095–1116. With 1 chart in text.

Macao, the first foot-hold of Europe in China, and now containing 140,000 people, came into Portuguese hands in 1557, but it is not till 1850, when cholera broke out, that there is any record of epidemics. In the last 70 years such epidemics, though often introduced, have been of short duration and low fatality. The present paper deals in turn with plague, cholera, smallpox, cerebrospinal meningitis and influenza.

The first epidemic of plague dates from April, 1895, a year after its appearance at Canton and Hong Kong. It lasted till July and appears to have caused 1,200 deaths. With the exception of the years 1910 and 1911 plague deaths were registered each year till 1915, the disease becoming epidemic in spring and dying away in the hot summer months.

Local conditions are such that importation by sea would be a frequent occurrence. Whereas at Hong Kong the annual recurrences lasted 6–7 months, at Macao they rarely exceeded 4, and since 1915 there has been no case of plague though the disease persisted at Hong Kong till 1923. These comparisons are of interest, because the territories on either side of the mouth of the Canton river are in constant communication. With the exception of a few years the plague mortality at Macao was not large enough sensibly to affect the normal mortality curve. The annual epidemics commenced with a temperature of about 20° C., developed with a temperature of 25° and high humidity, and declined when the temperature reached 30° and the humidity was below 50°. LEITÃO states that *M. decumanus* and *M. rattus* are both present at Macao, the latter being rare. The author has found *rattus* to be present in 30 per cent. proportion and *decumanus* in 60 per cent. The information about rat fleas lacks precision.

The epidemic of cholera of 1850 was part of the pandemic which began in 1846 and spread all over the world. Between this and 1866 there were 4 small epidemics, but from this year to 1883 no case occurred though the disease was prevalent in China, including Hong Kong. Since 1916 no case has occurred at Macao. Of the 9 epidemics the last six were attended by a mortality of only 10–30. The disease made its appearance in early summer with the heavy rain.

Smallpox is impossible to eradicate owing to the large (literally) floating population of 16,000 souls and the shifting population which exceeds 2,000,000 a year. In the years 1907, 1917 and 1924 there were 105, 124 and 195 deaths. Neither influenza nor cerebrospinal meningitis have seriously affected Macao.

A. G. B.

MELENEY (Henry E.). **China's Past and Present Opportunities in Tropical Medicine.**—*China Med. Jl.* 1926. Dec. Vol. 40. No. 12. pp. 1189–1203. [52 refs.]

An interesting and informing address delivered at a Conference of the China Medical Association, Peking. The author after pointing out that oriental medicine, because of the living conditions of even the northern oriental peoples, embraces hygiene and tropical medicine both in scope and point of view, divides the years during which western medicine has been practised in China into 4 periods.

(1) The *Pioneers.* This dates from the arrival of the first physicians of the East India Company late in the 18th century, one of whom (PEARSON) introduced Jennerian vaccination (1805). In 1836 was founded the "Medical Missionary Society in China." In 1870 Robert HART inaugurated the "Customs Medical Reports," the medium of publication of MANSON's work and for many years the only periodic record of observations on disease in China.

(2) The *Manson* period. An interesting account is given of MANSON's work in China which will be passed over here because it may be read in ampler detail in the recently published "Life and Work of Sir Patrick Manson" (MANSON-BAHR and ALCOCK). As one illustration of MANSON's pre-eminence the author writes—"It would be foolish to believe that insect transmission of disease would not yet have been proved without Manson's work, but he was so far ahead of his time that it remained for him, seventeen years later, to be the

first to accuse the mosquito of its second great offence, malaria transmission." The only other event of this period which is noted is KITASATO's discovery of the plague bacillus (1894).

(3) The period of *Observation.* This dates from the Boxer Rising (1900). The increased security of the foreigner and the stimulus to mission work led to a rapid increase in the number of British and American physicians in China, with the *China Medical Journal* as their medium of publication. Most devoted themselves to surgery and hospital administration, but a few turned to their microscopes and biological problems. Thus AIRD (1905) obtained leishmania by spleen puncture : LOGAN (1905) identified the egg of *Schistosoma japonicum* : GODDARD (1907) found heavy *Fasciolopsis buski* infection in Chekiang : LAMBERT (1910 & 11) identified urticarial fever as schistosomiasis. In 1907 a Research Committee of the C.M.M.A. was formed. The culmination of the period came with the publication of JEFFERYS and MAXWELL's " Diseases of China," which " stands as a milestone in the history of medicine in China."

(4) The present period, that of *Investigation*, which began with the foundation of the Republic. The first important participation of western trained Chinese physicians in disease prevention was now seen on the occasion of the outbreak of pneumonic plague in Manchuria, with Dr. WU LIEN TEH as Director. In 1913 official sanction was given by the government for the dissection of human bodies and the performance of autopsies [in the 70's MANSON had to leave a secret post-mortem examination and run for his life], and medical schools began to function on broader lines. In 1918 the Epidemic Prevention Bureau was established in Peking. In this period lay the work of BARLOW who, released from his regular duties for two years, worked out the life history of *Fasciolopsis buski* and established the curative value of carbon tetrachloride : that of CORT, GRANT and STOLL, who demonstrated the practical absence of hookworm in North China and its association in Central and South China with vegetable raising and the silk-worm industry, and noted the reduction of larvae in manurial excreta with storage : of WU LIEN TEH, who indicated the marmot as a source of pneumonic plague : of FAUST and KHAW, who have shown that the fish-raising industry is responsible for the high incidence of Clonorchis infection in Kwangtung Province. [The author's own work on schistosomiasis calls for mention here.] It is noted that full-time chairs of hygiene have been established in four medical schools.

Finally, the author discusses some lacunae in knowledge and failures to apply what is known. He points out that very little is on record about the anopheles of China. In Central China only one species has been reported. Cholera is one of China's scourges ; in 1919 the deaths were estimated at 300,000, but no adequate preventive steps are being taken. There follows a series of questions relating to schistosomiasis and the infection of the rice farmers. It is asked why filariasis in Central China, with Culex ubiquitous, is limited to certain areas, and why leprosy has its peculiar distribution. Splenomegaly with anaemia needs investigation and its relation to cirrhosis of the liver with ascites, which is common in China. What is the source of undulant fever in China ? Of beriberi he asks :—

> " Why do nearly all the cases of beri-beri seen in Peking occur in students who come from the south and who acquire the disease here while living on the same diet on which they thrive in health at home ? "

" Those problems which are peculiar to China will be solved when, and only when, they are deliberately attacked by those among us who realize that the searching out of ultimate causation is more important than the routine treatment of disease."

The paper ends with a useful list of references.

A. G. B.

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JOANNIDÈS (Georges Sp.). Quelques notes épidémiologiques sur le département de Messénie. (Faune malacologique et vulnérante, paludisme, F. typhoide, leishmanioses, lèpre). Août 1926. [**Epidemiological Notes on the Department of Messenia, Greece.**]—*Grèce Méd.* 1926. Sept.-Oct. Vol. 28. No. 9-10. pp. 33-36. [13 refs.]

The author, who writes from the Institut Pasteur Hellènique, says that Dr. ADAMOPOULOS has recently described cases of kala azar, microscopically controlled, from this part of Greece and Drs. G. BLANC and CAMINOPETROS have found oriental sore at Neapolis in the neighbouring department of Laconia. Messenia forms the western of the three Peloponnese peninsulas which project southwards, Laconia occupying the two other peninsulas. To the south again is Crete and between them the island of Cerigo in both of which leishmaniasis is found. Messenia is one of the warmest parts of Greece ; it is densely peopled, well cultivated and well watered. Laconia is dryer and much less populous.

The author examined two rivers in Messenia for molluscs, looking especially for Bullinus which occurs in Crete. He failed to find Bullinus but obtained numerous *Limnaea truncatula*, *L. palustris*, *L. limosa*, *Planorbis complanatus* and other genera. The abundance of *L. truncatula* explains the great frequency of distomatosis in sheep in Messenia. Of mosquitoes he captured *Aëdes argenteus* (abundant), *Anopheles superpictus* (numerous) and *A. maculipennis* (a few specimens). *Phlebotomus papatasii* were numerous and *P. sergenti* rare. Messenia is one of the most malarious departments in Greece. Two outbreaks of typhoid are mentioned in small towns on the east and west shores of the Gulf of Messenia, connected by a service of boats ; the water supplies were probably contaminated.

Kala azar was found in Hagia Anna, a suburb of Calamata. Here the houses have large gardens and these are rented for purposes of trade by people from outlying villages for a few years at a time. Eight cases have been diagnosed since the disease was first noted here in 1922. Kala azar is met with also along the railway from Pyrgos to Calamata and elsewhere in the department. He gives data of 39 cases [but nowhere states that parasites were found]. The ages varied from one to eight years, with the exception of one of 10 and one of 14 years. All but one child came from poor families. Domestic animals were numerous, but the people objected to any bacteriological examination of them ; all appeared healthy. Phlebotomus and other biting insects were seen in the houses. In most of the cases the disease was first noted between March and July. The incubation appeared to be 8 months or less. Two children, of 8 and 10, at Calamata were found to have oriental sore (Leishmania found) ; they came from Laconia where they were probably infectors.

CIGALLA reported 97 lepers from this region in 1858. ADAMOPOULOS has found about a dozen cases of nodular leprosy, always more than one in a family; most of these are now in the leper colony at Spinalonga, Crete [see this *Bulletin*, Vol. 22 p. 568].

A. G. B.

GUTIERREZ (Perpetuo Dionisio) & GUTIERREZ (Aureo Francisco). **An Analysis of 76,532 Cases admitted to the Philippine General Hospital.**—*Jl. Philippine Islands Med. Assoc.* 1926. Nov. Vol. 6. No. 11. pp. 359–372. With 8 charts.

The disease that tops the list is ascariasis, 15·82 per cent. of all cases. [We are not told whether a faecal examination is always made.] Next comes pulmonary tuberculosis, 6·16 per cent., and if all tubercular diseases are added, 9·02 per cent. Amoebic dysentery comes third. Fortunately, liver abscess is an unusual complication; it occurred in 3·11 per cent. of cases of amoebic dysentery. If one adds in half the cases of dysentery of undetermined origin, the percentage becomes 5·93, nearly as high as pulmonary tuberculosis. Influenza comes next; a chart shows that prior to the rise of influenza dengue, prevalent in 1913, had almost disappeared by 1916, and has varied little since. The authors ask, " Are we seeing cases of dengue and diagnosing them as influenza? " Fifth comes typhoid, with fatality ranging from 23–32 per cent. It is transmitted in Manila by personal contact and possibly by flies. Malaria is next on the list, and after ankylostomiasis and acute bronchitis we come to broncho-pneumonia. Tenth and next comes syphilis with 2·88 per cent. of cases. The authors believe this percentage to be too high and state that up to 1914 all positive Wassermanns were diagnosed as syphilis, to the neglect of yaws; syphilis, they say, should come 22nd. They note that out of 38 cases of tabes dorsalis 26 occurred in Filipinos, 10 in Americans and 2 in Chinese; and among 6 cases of general paralysis 4 were Filipinos. [Unfortunately we are without figures of the respective hospital admissions for all diseases.] Eleventh in the list comes chronic nephritis " which seems to us too high," and 12th lobar pneumonia, 2·27 per cent. Skipping over gastritis, acute nephritis, secondary anaemia, polyneuritis, cholecystitis, cystitis, mitral insufficiency, gonorrhoea, rheumatic fever, dengue, impetigo, we come to dry beriberi; if polyneuritis is added to all the beriberi cases the disease would come 11th in the series. There seems no tendency for this disease to decline. The 26th place is occupied by bacillary dysentery; towards the end of 1918 the number of cases increased greatly; the authors suggest this may have been a gastro-intestinal form of influenza.

A. G. B.

MENDELSON (Ralph W.). **The Immediate Effect on the Liver Temperature as a Result of lowering the Intragastric Temperature with Ice-Water.**—*Jl. Trop. Med. & Hyg.* 1927. Mar. 1. Vol. 30. No. 5. pp. 64–67. With 6 charts in text.

As a result of experiments on dogs designed to throw light on affectation of the liver in man in hot climates and in which the stomach was filled with ice-water and the temperatures in the liver and neighbouring sites were read on thermometers introduced through skin incisions, it is concluded that the temperature of the liver is affected by lowering the intragastric temperature; the fall is about 2°C. Controls are not mentioned.

[GREENE & ROWNTREE found that a decrease in body temperature is produced in dogs by the forced administration of excessive amounts of water even though the water is given at a temperature equal to or slightly above that of the body. (*Am. Jl. Physiology.* 1927. Vol. 80. p. 230.)]

A. G. B.

MAGATH (Thomas B.) & SHEARD (Charles). **Spectrophotometric Analysis of Blood Serum in Normal and Pathologic Conditions. Study I.**—*Arch. Intern. Med.* 1927. Feb. 15. Vol. 39. No. 2. pp. 214–225. With 6 text figs. [21 refs.]

The authors' observations on the yellow pigment of the blood-serum lead them to the conclusion that it is bilirubin. This is so for normal people, as well as for those suffering from malaria, pernicious anaemia, haemolytic jaundice and jaundice due to obstruction. The degree of bilirubinaemia varies, but in the order named the relative amounts are indicated. No evidence is afforded by spectrophotometry that the bilirubins are different. Usually one hour after transfusion in pernicious anaemia the serum shows a rise of bilirubin. Any process leading to too rapid destruction of blood or too slow secretion of bile results in bilirubin retention. The opinion is finally expressed that all jaundice is haemolytic. The paper contains full details of the method used including an account with diagrams of the spectrophotometer employed (that of KEUFFEL and ESSER).

W. D. Halliburton.

BAIS (W. J.) & VERHOEF (A. W.). Anthropologisch bloedonderzoek bij verschillende rassen in Nederlandsch-Indië. [**Anthropological Blood Examination among Various Races in the Malay Archipelago.**] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 7–11. [4 refs.]

The investigation was carried out in Medan (Sumatra). The groups are arranged in accordance with JANSKY'S scheme. The blood was examined of 1,346 Javanese, 546 Sumatrans, 592 Southern Chinese, 348 Tamils (Klinghalese). The results are as follows :—

| Among the : | Belonged to Jansky's Group. | | | |
|---|---|---|---|---|
| | I. Per cent. | II. Per cent. | III. Per cent. | IV. Per cent. |
| Javanese ... ... | 39·9 | 25·7 | 29·0 | 5·4 |
| Sumatrans ... ... | 43·7 | 23·0 | 29·0 | 4·3 |
| Chinese ... ... | 40·2 | 25·0 | 27·6 | 7·2 |
| Tamils ... ... ... | 37·9 | 23·0 | 31·6 | 7·5 |

The biochemical blood-index of the Hirschfeld's, to be derived from these figures, is :—

| | |
|---|---|
| For the Javanese ... ... ... | 0·9 |
| ,, ,, Sumatrans ... ... | 0·82 |
| ,, ,, Chinese ... ... ... | 0·92 |
| ,, ,, Tamils ... ... ... | 0·78 |

The index of the Tamils is higher than that found by the Hirschfelds among the Indian soldiers in the Balkans (0·56) and that among the Southern Chinese is likewise higher than that found by Liu and Wang among Northern Chinese (0·82).

N. H. Swellengrebel.

Heinemann (H.). Enkele opmerkingen omtrent vergelijkende Physiologie en vergelijkende Pathologie. **[Some Remarks on Comparative Physiology and Comparative Pathology.]**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 36–42. [Refs. in footnotes.]

This is a plea for the study of the sciences mentioned in the title, difficult to summarize.

The difference between pathology in Europe and in the East lies not so much in the occurrence of real tropical diseases as in peculiarities in symptomatology, occurrence and significance from a public health point of view, which the ubiquitous diseases show in the tropics.

The possible relation is discussed of the absence (at least rarity) of metasyphilitic affections, diabetes and amyloidosis in Javanese labourers with physiologic influences of the tropical climate. Of course much of the argument produced is of a speculative character.

The equilibrium between the antagonistic systems calcium-adrenalin-sympathetic on one hand and potassium-insulin-vagus on the other may be interfered with by physical influences, e.g., the tropical sunshine, the physiologic action of which on the carbon dioxide tension of the alveolar air was shown by Radsma (see this *Bulletin*, Vol. 23, p. 635).

Physiological " vagotonic stigmatisation " in the native may afford protection against general paralysis in the same way as malaria acts therapeutically in this disease, which action, according to E. F. Müller, is to be ascribed to vasomotor influences on the diseased tissues via the vegetative nervous system.

Pigmentation by insolation decreases the thyrosin content of the blood, which may account for the rarity of amyloidosis, thyrosin being an important component of amyloid. At the same time insolation has an influence on the adrenals and on carbohydrate metabolism, generally speaking in the sense of an increased sugar tolerance, which could explain the infrequent occurrence of diabetes. Differences between pigmented and white races in this respect may be expected and could throw more light upon the question.

W. J. Bais.

Mendelson (Ralph W.). **Clinical Observations from the Central Hospital, Bangkok, Siam.**—*Arch. Dermat. & Syph.* 1927. Mar. Vol. 15. No. 3. pp. 298–303. With 9 text figs.

The cases briefly described with photographs are : Papillary adenomata of the sweat glands, amoebic dysentery (perforation of colon), endothelial sarcoma of the tongue, carcinoma of the lips and cheek in a betel nut chewer, yaws and gangosa, nearly all advanced cases.

A. G. B.

SACK (Arnold). Altägyptische Mumienfunde im Lichte der Pathologie. [**The Pathology of Mummies of Ancient Egypt.**]—*Muench. Med. Woch.* 1927. Mar. 4. Vol. 74. No. 9. pp. 372–373. [18 refs.]

Amongst the numerous signs of disease found in the examination of 30,000 mummies syphilitic bone lesions were discovered in no single case, which confirms the author in his belief that syphilis is not an old world product. The onlv case of leprosy belongs to the early Christian period, evidence that the Zaraath of the Bible had nothing to do with true leprosy.

[Dr. Hugh J. MEANS,* of Columbus, Ohio, examined by X-rays 500 skeletons from one of the Ohio mounds or earthworks, made by a prehistoric people at the stone age of development. Many skeletons were fragmentary.

" Definite gross and roentgenological evidence of syphilis was found in three skeletons. They presented varying degrees of involvement, from a simple periosteal thickening and roughening on the crest of the tibia, to thickened ivory-like bone invading the medullary canal with gumma formation."

The lesions are figured. He writes: It has been clearly proven that syphilis existed and was a fairly common disease.

As far as the findings of SACK & MEANS go (the former does not appear to have used X-rays), they support the New World origin of syphilis.]

A. G. B.

SITSEN (A. E.). De gewichten van eenige organen bij den Maleier. [**The Weights of some Organs in the Malay.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 2. pp. 167-177. [7 refs.]

The author gives a table of the standard average weights of various organs in the Malay race, which may be useful for comparative purposes. The data were obtained from the post-mortems of 120 males and 9 female adult individuals, who were killed by accident or murder and free from pathological changes.

The height varied from 1·46–1·80 M., the weight from 36–61 kg., the weight per M. height from 21–37 kg., the weight of the heart from 109–196 gm. per M.height. For further details concerning lungs, spleen, liver, kidneys, pancreas, adrenals, testicles, thyroid gland, thymus, brain, and for comparison with European figures the original paper should be consulted.

W. J. Bais.

SEIDELIN (Harald). **Sterilization of Catgut by Means of Aniline Colours.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Nov. 25. Vol. 20. No. 4. pp. 307–309. [4 refs.]

Dr. Seidelin brings to the notice of the profession a new method of sterilizing catgut for ligatures and sutures which is likely to be gratefully welcomed by surgeons practising in the tropics. It is well known that in hot countries material of this kind deteriorates with keeping much more rapidly than in temperate climates, where moreover sterilized catgut of good quality can be purchased at any time in quantities suited to the requirements of the moment. In the tropics considerable supplies have often to be maintained in store, and these may not infrequently remain unexpended for lengthy periods, with the inevitable result that, when brought into use, the material is discovered to be unserviceable, iodine catgut being found brittle and catgut preserved in alcohol becoming stiff and difficult to handle. Raw catgut on the other hand keeps well, as Dr. Seidelin notes, and an easy and reliable method of sterilizing it in any quantity, at any time, and in any place is now described. The technique involved combines the consecutive action of three powerful antiseptics: Oil of cloves, absolute alcohol, and a solution of crystal violet and brilliant green. This solution is known as " blue," being of a deep blue colour not unlike a solution of methylene blue. For details readers must be referred to the original paper, but briefly the process consists in submerging raw catgut, thoroughly dry and wound on glass spools, in oil of cloves for at least 24 hours; it should then be soaked in absolute alcohol until not the slightest smell of cloves remains, but not for more than 48 hours. The gut is finally transferred to the blue solution of one gramme each of crystal violet and brilliant green in 300 cc. of 50 per cent. alcohol, where it remains and is ready for use after 48 hours. The author has found it in perfect condition after more than two years in the solution. The thread is perfectly supple, easy to tie, and gives a tight knot, its tensile strength being unimpaired. Both clinical and laboratory tests have shown catgut thus prepared to be sterile. Staining of the hands is the only inconvenience entailed by its use, but with rubber gloves this is a drawback of no real importance. Mr. CHITTY, Surgeon, Bristol Royal Infirmary, writes in September, 1926, that he has employed catgut prepared by this method for all his hospital operations for upwards of twelve months; that he has found it strong and supple; that in no case has he had a stitch abscess due to the catgut, although he has employed it in numerous septic cases; that the dye-stuff is non-irritating, and that he has used it with satisfactory results for swabbing out appendix abscesses and septic wounds.

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* " A Roentgenological Study of the Skeletal Remains of the Prehistoric Mound Builder Indians of Ohio." *Amer. Jl. Roentgenology & Radium Therap.* 1925. Vol. 13. pp. 359–367. With 6 plates.

J. J. Pratt.

MESNIL (F.). Therapeutica pelos compostos de arsenico e de antimonio. [**Therapy by Means of Compounds of Arsenic and Antimony.**]—*Rev. Med.-Cirurg. do Brasil.* 1927. Feb. Vol. 35. No. 2. pp. 29–36.

This is a paper contributed by Professor Mesnil of Paris reviewing historically and chronologically the use of arsenical and antimonial compounds in various diseases of man. He shows how the preparation of the compounds has been carried out on scientific lines and not merely in a haphazard manner, that new substances are manufactured in the chemical laboratories in series, according to previously determined formulae, that they are then tried on laboratory animals before application is attempted in human cases. He has a few words to say on the uses of arsenic in protozoal infections—trypanosomiasis, malaria—and spirochaetes, and of antimony in trypanosomiasis, leishmaniasis and schistosomiasis.

H. Harold Scott.

VAN DEN BRANDEN (F.). Note sur l'emploi du stovarsol dans le traitement de quelques affections tropicales. [**Note on the Use of Stovarsol in the Treatment of Tropical Diseases.**]—*Bull. Méd. du Katanga.* 1926. May. Vol. 3. No. 2. pp. 48–51.

The author treated 27 cases with stovarsol, 13 of yaws, 8 of amoebic dysentery and 6 of trypanosomiasis.

*Trypanosomiasis.*—Larger doses were given than those advised in Europe. A patient of 67 kilos received in all 54 gm. in 23 days and another of 54 kilos 45 gm. in 17 days; the trypanocidal action was slow and transient.

*Amoebic Dysentery.*—Of the 8 cases 2 relapsed in a few days, and in 4 the amoebae did not disappear from the stools; 3 of these were resistant to emetine. Two seemed to have benefited. The author suggests the association of stovarsol and emetine.

*Yaws.*—The author gives 1 gm., 1·50, 2, and 3 gm. daily in the adult and 0·5, 0·75, and 1 gm. in children. In all he gives as many grammes as the patient's weight in kilos. He considers stovarsol to be the medicament of choice in the ambulatory treatment of yaws, having the great advantage for the native that it is taken by mouth.

A. G. B.

SNIJDERS (E. P.). Eenige met stibenyl behandelde ziektegevallen. [**On a Few Cases treated with Stibenyl.**]—*Nederl. Tijdschr. v. Geneesk.* 1926. 70th Year. 2nd Half. No. 25. 4 pp. With 5 text figs.

The drawbacks of tartar emetic (difficulty in obtaining the chemically pure drug, necessity of intravenous administration, relatively small difference between therapeutic and toxic doses and by-effects) can be avoided by the use of stibenyl, a stable preparation, the toxicity of which is only 1-10 that of tartar emetic.

Snijders reports upon 3 cases which (with SCHÜFFNER) he treated with this drug: (1) A case of oriental sore, which healed under treatment with injections of stibenyl (4·6 gm. in 5 weeks); (2) a case of filariasis, in which 2 gm. had no effect upon the disease; (3) a doubtful case of Hodgkin's disease in which stibenyl, substituted for arsenicals, which apparently were indicated, 3 gm. in 1 month, followed by a similar course after 6 weeks, produced clinical cure of the disease.

W. J. Bais.

ACTON (Hugh W.). **Principles in the Testing of a Cure.**—*Indian Med. Gaz.* 1926. June. Vol. 61. No. 6. pp. 271–278. With 2 text figs. & 2 charts in text. [10 refs.]

" 1. Cures may be of two kinds, permanent or temporary. In the latter condition, the causative agent of the disease is still present, but not in sufficient numbers to give rise to symptoms.

" 2. Permanent cures may occur with complete recovery of the tissues, or may be incomplete with impairment or loss of function.

" 3. In every test of a cure, the data of composition of the population tested should always be given as regards its important aetiological factors such as age, habits and customs, etc., since these factors may profoundly influence the course of the disease.

" 4. The two populations compared, those under test and the controls, should be similar in every respect; e.g., with regard to numbers, homogeneousness, etc.

" 5. The percentage mortality or cure rate is obtained by observations on 100 individuals; not by elevating observations on digits into percentages.

" 6. A homogeneous population under test can only be secured by avoiding bias, and paying attention to the law of chance sampling.

" 7. The testing and control experiments should be carried out under identical conditions in order to avoid obtaining the results of only partial correlations. Also tests for a cure should if possible be carried out in non-infective areas, with regard to protozoal diseases, especially, in order to exclude the chances of re-infection.

" 8. Only differences between the two groups of a significant order should be considered; e.g., those outside the range of chance sampling, or partial correlation.

" 9. The permanency of a cure can only be tested by time, the continued well-being of the patients, and the effect of the introduction of the cure on the mortality rate for a given disease in the general population.

" 10. In cases of rare diseases, where large numbers of observations are not possible, one has to rely on diseases which show chronicity before treatment, large mortality rate, and the rapid disappearance or arrest of the diseases when under treatment.

" 11. The relative value of a modification of treatment, e.g., of the comparative value of the dry cord method and the dilution method of Hoghyes in anti-rabic treatment, or of the different pentavalent compounds of antimony in the treatment of kala-azar, can only be tested on a large scale. Consideration must also be paid to the relative toxicity to the body of the different compounds used, apart from their therapeutic value."

The above are the author's summary and conclusions. The main contention of the paper is that too often, in assessing the value of any line of treatment, the groups compared—the treated and the controls—are not strictly comparable at all. With regard to snake-bite, the author instances the common error of including in a group all the treated and cured irrespective of lack of knowledge of the dose of venom received, and comparing this with a group which includes all those so severely bitten as not to survive until treatment was possible.

In the case of rabies it is pointed out that a falling annual percentage mortality, among those receiving Pasteur treatment in India, probably means nothing, for each year an increasing number of people apply for treatment who are not really at risk at all, having either been bitten by a non-rabid animal or not effectively bitten by any animal.

Other inexpert manipulations of statistics by medical men are touched on.

The treatment of amoebic liver abscess by emetine is instanced as a cure which is undoubtedly efficacious. [In graphs purporting to demonstrate the good effects of emetine, the doubtfully beneficial results following antirabic treatment, and the employment of antivenene, Major Acton falls into one of the pitfalls against which he warns his readers. He uses the total annual deaths from 1890 to 1924 in " the British Army and families, Indian Army and Jails," as an index of the efficacy or otherwise of treatment, without regard to the variation (probably considerable in that period) of the number and other circumstances of the lives at risk. Contrary to what is said on p. 276, Chart I does not tell anything of *the mortality rate* attributable to liver abscess; it deals solely with total mortality from that disease over 34 years among an unstated population, variable as to number, character and other circumstances.]

J. F. C. H.

FRANKENBERGER (Charles). **Medical Periodicals from the Library Standpoint.**—*Jl. Amer. Med. Assoc.* 1926. Aug. 21. Vol. 87. No. 8. pp. 612–614.

The author, as a Librarian, puts the case for greater uniformity and standardization in medical periodical publications. Those responsible for the publication of journals are asked to give short titles to their periodicals so as to economize space in bibliographies and catalogues and cost in lettering on bound volumes; to avoid a change of title in the course of a volume; to print on the front cover and on the first page of text of each issue the volume, number or part, year, month, and if issued more often than monthly the day of month; to use a single continuous pagination throughout a volume; to issue a title-page and index to each volume; to keep supplements the same size as the parent journal if intended for binding up with the main volume; to give definite notice of suspension or discontinuance of publication, or of mergence with another publication, and to indicate clearly the number of the series, as " 2nd Series," " 3rd Series," if a new series of an existing publication is started.

The author would have each volume begin and end in the calendar year, the first part of each volume numbered 1. He prefers the use of Arabic to Roman numbering in bibliographies, indexes, and references. In his opinion some standardization in the arrangement of running titles is desirable; he commends in this connexion the style, adopted in the American Medical Association's publications, of giving the title of journal at the top of each left-hand page, and the author's name and a short title of article at the top of each right-hand page. The problem of library shelving and filing would be much simplified also if there were some standardization of sizes—at present medical journals vary in size from that of a postcard to that of a daily newspaper.

The practice of continuing the reading matter on to advertisement pages is condemned; as also that of splitting up a periodical under one main title into several sub-divisions such as "Originale," " Referate," with in some cases a different sub-title also. Each periodical, in the author's opinion, should appear as a unit in itself under its own distinctive title and volume and issue number.

Several periodicals, representative of the larger group in which are found some of the variations or defects referred to, are named in the hope that his article may come to the notice of those able to effect some improvements in these matters.

[One would suggest also the advantage of printing on the front cover of a periodical a note of the inclusive pagination of the number and an indication of where the contents-page or pages will be found. If also publishers would instruct their printers to trim the heads and fore-edges and tails of journals before issue much time with a paper knife would be saved to readers and to library staffs.]

R. L. S.

MENGERT-PRESSER (H.) & DONATH (W. F.). Ueber Haemoglobin- und Eisenbestimmungen im Blut der in den Tropen lebenden Menschen. [**Haemoglobin and Iron Content of Blood of Men resident in the Tropics.**] —*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 1. pp. 537–589. With 18 figs. [39 refs.]

The haemoglobin and iron content of the blood of men residing in the tropics was investigated by means of the methods of Sahli and Lapique respectively. This work was republished in *Meded. Dienst. d. Volksgezondheid in Nederl.-Indië,* 1926, Pt. 3. pp. 240–277 and was reviewed in this *Bulletin,* 1927, pp. 490–492, to which reference should be made.

H. E. Whittingham.

MAZZA (Salvador). Recuerdos médicos y otros recuerdos de Argelia y Túnez. Notas de viaje. Primera parte—notas de Túnez. [**Medical and other Mementos of Argelia and Tunis.**]—*Rev. d. Circulo Med. Argentino y Centro Estudiantes de Medicina.* 1925. Nos. 285, 286 & 292. 71 pp. With 31 figs. 1926. Buenos Aires.

This is the first part of an account of the author's tour, namely, that dealing with Tunis. Nearly the whole is taken up with a panegyric on the work of the Pasteur Institute there, the author acting as Boswell to NICOLLE's Johnson. He writes chattily also on points of local interest and of the local superstitions, but nothing of true scientific importance is treated in detail and all the subjects mentioned will doubtless appear (such as have not already done so) in the official reports of the Institute.

H. Harold Scott.

GABBI (Umberto). Per una Scuola di Patologia clinica ed Igiene Coloniale in Italia. [**Need for a School of Clinical Pathology and Colonial Hygiene in Italy.**]—*Giorn. di Clin. Med.* 1927. Feb. 28. Vol. 8. No. 3. pp. 107–114.

General remarks on the advantages to Italy of a school for instruction in tropical problems, mentioning the subjects which should be taught and the individuals who would benefit by attending such a course.

H. Harold Scott.

GEORG (C. Th.). Aus dem Hospital San Antonio, San Pedro de Macoris, Santo Domingo. [**From the San Antonio Hospital, Santo Domingo.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Jan. Vol. 31. No. 1. pp. 41–44. With 3 text figs.

Three cases are described with photographs : (1) elephantiasis of the arm after removal of axillary lymph glands for a tumour ; (2) ankylostomiasis with nanism ; (3) syphilitic gumma and ulceration of leg.

A. G. B.

MELNOTTE (Pierre) & FARJOT (Antonin). Ictère infectieux fébrile à type pseudo-palustre d'origine colibacillaire. [**Febrile Infectious Jaundice of Pseudomalarial Type and Colibacillary Origin.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Mar. 24. Year 43. 3rd Ser. Vol. 51. No. 10. pp. 364–366. With 1 chart in text.

A case of febrile jaundice in which the temperature resembled that in benign tertian malaria. From the blood, which contained no malarial parasites, a typical *Bacillus coli* was isolated. The patient was successfully treated by oral administration of a vaccine prepared from cultures of this organism.

C. M. W.

ABEN-ATHAR (Jayme). Iso-aglutininas do sangue dos brasileiros.—*Sciencia Med.* 1927. Mar. 31. Vol. 5. No. 3. pp. 145–153.

CHOAY (André). Voyage d'études en Orient.—*Rev. Prat. Malad. des Pays Chauds.* 1927. Jan. & Mar. Year 6. Vol. 7. Nos. 1 & 3. pp. 5–48; 116–124.

CHOPRA (R. N.). Some Aspects of Therapeutics in India.—*Indian Med. Gaz.* 1927. Mar. Vol 62. No. 3. pp. 151–157.

DUBOIS (Albert). La médecine tropicale en 1926.—*Bruxelles-Méd.* 1927. Apr. 17. Vol. 7. No. 25. pp. 785–797. [130 refs.]

FORREST (Stanley). Case of Peri-Appendicular Abscess in a Muganda in Entebbe Civil Hospital.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 552–553.

IYER (M. A. Krishna). Notes on Infantile Cirrhosis of the Liver.—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. pp. 130–131.

MARSHALL (Wilfrid). A Study of Santonin Xanthopsia.—*Jl. Pharm. & Experim. Therap.* 1927. Mar. Vol. 30. No. 5. pp. 361–388. With 1 text fig. [23 refs.]

——. Santonin Excretion and its Relation to Santonin Xanthopsia.—*Jl. Pharm. & Experim. Therap.* 1927. Mar. Vol. 30. No. 5. pp. 389–405. With 9 text figs. [6 refs.]

MARTINELLI (Giuseppe). Relazione sanitaria dell' anno 1926.—*Arch. Ital. Sci. Med. Colon.* Tripoli. 1927. Apr. Vol. 8. No. 4. pp. 209–213.

MOTEKI (Kuranosuke) & KIMURA (Hiroshi). On the Treatments of Elephantiasis. —*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 99–100.

# REVIEWS AND NOTICES.

LEAGUE OF NATIONS. Health Organisation. C.H. 523. 387 pp. With numerous illustrations. 1926. Dec. Geneva. **Progress of the Science of Nutrition in Japan.** With an Introduction by Tadasu SAIKI.

This volume, published by the League of Nations under the direction of Tadasu Saiki, has already been reviewed by Professor MELLANBY in the *Bulletin of Hygiene*, v. 2, 505. Nevertheless it was thought that a more detailed account of the studies on rice might be helpful to those workers who have charge of patients in countries where rice is the chief article of diet.

There are seven chapters dealing particularly with this subject. Each chapter gives an account of one aspect of the problem and one author, with or without collaboration, is responsible for each. For convenience this method of presenting the subject will be followed.

I. Rice is the staple food of the Japanese. In its crude form it has been in use for centuries but it was only about two hundred years ago that the process of polishing was introduced. Since then this process has gradually become universal. It is of obvious importance, therefore, to determine what effect polishing has upon the digestibility and utilization of rice.

Experiments were carried out on human subjects and the method is described in some detail here as it is used in other sections of the work. Each experiment lasted thirteen days. The first three days were a preparatory period and the last two days were not strictly part of the test. The intervening period of eight days was divided into four periods of two days each, called, respectively, the " polished rice period," the " half-polished rice period," the " 70 per cent. polished rice period," and the " unpolished rice period." The rice used was third grade " Shonai," commonly used by the Japanese. Carefully measured and controlled side dishes were allowed. The urine and faeces were examined during the various periods and very thorough chemical investigations were carried out.

A second series of experiment was instituted, using not only one kind of rice, as previously, but two different kinds.

Among other results it was found that the higher the grade of polishing the greater is the digestibility and utilization of the rice. Also that the " quantity of rice eaten to supplement standard side dishes was always greater when the polishing grade of rice was higher ; when unpolished rice was eaten, the consumption of side dishes was obviously small, and it appeared that the calorie intake was insufficient for the requirements of the body."

II. The second section deals with the effects of various cooking methods upon the digestibility of rice. The method of experiment was similar to that used in the previous section. It was found that " Dango " (powdered rice mixed with water, made into balls and cooked) was more digestible than ordinary boiled rice ; Dango made from unpolished rice was better than boiled unpolished rice; boiled rice was better than stewed rice. Many more preparations were studied but it is impossible in a small space to describe these.

III. Variations in the protein oryzanin are responsible for the differences between glutinous and common rices and not variations in the starch as was formerly believed by many. If this be true there should be chemical and physical differences in the protein from the two varieties of rice. Experiments showed this to be the case.

IV. In different parts of Japan different varieties of rice are used for fermentation. This must depend upon the specificity of the proteins of various rices. Experiments show that there are in fact such physico-chemical differences between oryzanins derived from different sources.

V. Starches, as is well known, vary in their properties according to their origin. In rice there are two starches, common and glutinous. The former gives a blue reaction with iodine, the latter a red or purple colour. No other differences between these two starches have been described so far in the literature. This section gives an account of work making good this defect in our knowledge by showing that there are many other physicochemical differences between these two starches besides their behaviour with iodine.

VI. This section deals with the oxidising ferments present in rice. Many interesting findings are detailed, among which are the following; the catalase activity of rice differs according to the variety of the rice and where it was grown. This activity varies with the grade of polishing and its diminution during a year's storage runs parallel with the decrease with vitamin B content of the rice.

VII. The polishing of rice, as might be expected, causes an alteration in its chemical constituents. The process slightly lessens the amount of protein, while fat, ash and fibre are greatly diminished. On physiological and economic grounds 70 per cent. polished rice (i.e., rice which still retains about 30 per cent. of the outer layer and germ) has much to recommend it. This grade contains from 0·5–0·8 per cent. of phosphorus.

This book represents an enormous amount of labour, containing as it does accounts of numerous experiments carried out with the utmost detail. The reviewer feels that he has done but scant justice to this most important contribution to the literature of this subject.

A. Douglas Bigland.

JOYEUX (Ch.) [Professeur agrégé à la Faculté de Médecine de Paris, Secrétaire général de la Société de pathologie exotique de Paris, Ex-médecin de l'Assistance indigène en Afrique Occidentale]. Précis de Médecine Coloniale. **[Précis of Medicine in the Colonies.]**—831 pp. With 139 text figs. 1927. Paris VIe: Masson et Cie, Editeurs, 120 Boulevard Saint-Germain. [65 francs.]

There will be general agreement with the author that the primary condition for successful practice in hot countries is to be well trained in all the subjects of medical study. Nevertheless, there are not a few diseases which are rare outside of hot countries. It is to these that this book is devoted. In its 800 odd pages the author has set out concisely, clearly and interestingly the essential practical facts of the epidemiology, aetiology, diagnosis, treatment and prophylaxis of "tropical" diseases. Here one can make only one criticism—that in some diseases methods of treatment now well known to German and English workers receive little or no mention. However, it is true, no treatment is as yet fixed. The author wisely takes it for granted that the practitioner has no laboratory service at his near disposal and, rightly, that he is equipped with microscope and knowledge how to use it. [Indeed, medical practice in the tropics without microscopy is really more, and worse than, foolhardy practice.] The pure parasitology of tropical diseases therefore is given but brief, yet accurate, exposition. Only those worldwide diseases presenting some apparent peculiarities in their evolution in the tropics are dealt with, and the book ends [should it not begin ?] with a chapter on sea sickness. The book is well printed, aptly illustrated and well indexed and contains a useful, up-to-date, and not forbiddingly large bibliography.

H. M. Hanschell.

Brooke (Gilbert E.) [M.A.Cantab., L.R.C.P.Edin., D.P.H., F.R.G.S., Chief Health Officer, Singapore, etc.]. **Aids to Tropical Medicine.** Third Edition Revised.—pp. x + 228. With 30 figs. and frontispiece of 7 figs. 1927. London: Baillière, Tindall & Cox, 7 & 8, Henrietta Street, Covent Garden, W.C.2. [4s. 6d.]

This book is not, and the author says so, in any way a text book. It is meant to be " a . . . notebook, in which a concise and up-to-date summary of the chief points may be found." Such a book would have its uses if only for revision before examination. This edition, the third, does not, however, quite fulfil the author's purpose. In some particulars it is out of date. For example, one may note that there is no mention of bismuth in framboesia therapy; nor of the diagnostically useful because characteristic differences in the cellular exudates of the bowel in bacillary and amoebic dysentery; for liver abscess resection of rib, or as alternative the technique of Manson's trocar, is recommended. But there must always be some difference of opinion about the chiefness of points. Many of the text figures are informative only in the most elementary sense.

H. M. Hanschell.

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## Medical Zoology (Correspondence).

Falleroni (Domenico). **Fauna anofelica italiana e suo " habitat " (paludi, risaie, canali). Metodi di lotta contro la malaria.**—*Riv. di Malariologia.* 1926. Sept.–Dec. Vol. 5. No. 5–6. pp. 553–593.

——. **Note sulla biologia dell'** "*Anopheles maculipennis.*"—*Ibid.* July–Aug. No. 4. pp. 353–380.

"In two abstracts of my papers, as reported in your issue of June, No. 6, pp. 424 and 426, is said that my work does not contain anything new. As it regards the first paper, may I call your attention to some of the experiments that I have carried out and which I believe are entirely new; that is: the mutilation of various parts of the mouth apparatus of the mosquitoes, the suction through segments of mice bowels, full of sugar liquids, the suction through the skin, under which I had previously injected sugar solutions.

"Likewise some of the observations contained in my paper are new; that is: that the liquid sucked by the mosquito through the puncture process passes at once to the stomach; on the contrary, the sugar solutions, the fruit juices, unmixed liquids, when sucked through the aspiration process, pass at first into the diverticula. The two different suction processes have a different physiological significance; they are in fact correlative to the different use of the liquids sucked by the anopheles, and also exclude the possibility (as Grassi feared) of a direct transmission of malaria. This mode of transmission can be also excluded following my observation that the crop contents (gases, blastomycetes and their enzymes) are not introduced by the mosquito into the wound during the first stage of suction. This is in opposition to Schaudinn's opinion.

"I have also observed that anopheles bite for sucking blood only and do not bite fruits; that the oesophageal diverticula are not food reservoirs (in opposition to opinion of various authors, as Nuttall and Shipley, Patton and Cragg, Genna, Grassi, Rees Wright); that blood passes at once into the stomach of the anopheles even when this blood is sucked during the digestion process or when the ovaries full of ripe eggs exercise a pressure upon the stomach (in opposition to what James believes); that the rest of the reproductive activities during winter does not depend on a cyclical intoxication from an insufficient renal function (as ROUBAUD believes); in fact, these reproductive activities can be restored in that season by heat; that the acidity of the fruit juices does not modify the reaction of the stomach, because these juices pass into the diverticula; therefore the development of the parasites cannot be prevented; if the juices pass in small parts into the stomach, they are neutralized by the reaction of this organ, which is alkaline, etc.

"In the other paper I have distinguished three kinds of the eggs of the *Anopheles claviger* (*maculipennis*) and stated that they are correlative to morphological and biological differences of the winged insect. In my opinion this is sufficient to justify the differentiation of at least two sub-species, which I have named var. *messeae* and *labranchiae*. Since then, A. de BUCK, B. SCHOUTE and N. H. SWELLENGREBEL in Holland have also distinguished two types of that species. Furthermore, I have stated that the absence of the air chambers in the eggs of the *A. elutus*, a characteristic described by EDWARDS as distinctive of this species (1921), is not constant; on the contrary, inconstant, the gray incrustation, uniform in colour, without speckling or black spots of the eggs, a character which I for the first have noted.

"In this paper I stated that the anopheline fauna of the rice fields can be identified with that of marshes, and ascertained that the differences of the sanitary condition of the various rice districts depends on the protective action of the stabled domestic animals, action which I believe the simplest, most efficacious and practical means for fighting malaria."

D. Falleroni.

Colonel Alcock, the writer of the abstracts in question, has no comment to make on Dr. Falleroni's letter [Ed.].

## NOTICE.

We have received a copy of Messrs. Baird and Tatlock's Standard Catalogue of Scientific Apparatus, 1927; Vol. III, Biological Sciences. This is a profusely illustrated bound volume of some 500 pages, dealing with Anatomy and Embryology, Biology, Microscopy and Histology, Bacteriology and Protozoology, Pathology, Hygiene and Agriculture, and is arranged for ready reference to each of these subjects. Turning to Section 4, Bacteriology and Protozoology, we find listed autoclaves, sterilizers, incubators, inspissators, vaccine baths, centrifuges, etc., and here are to be found the apparatus of glassware, media, sterilization, cultivation, staining and the like. The catalogue is fully indexed.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN

Vol. 24.] 1927. [No. 11

## MEDICAL ZOOLOGY.

Blacklock (D. B.) & Gordon (R. M.). **The Experimental Production of Immunity against Metazoan Parasites, and an Investigation of its Nature.**—*Lancet*. 1927. Apr. 30. pp. 923–925. [6 refs.]

The immunity here predicated is emphatically not to be confused with a mere toleration of a usually noxious parasite, or with an immunity acquired by age; but is a potent immunity acquired as the result of previous infection, and destructive of the specific parasite.

The parasite in this instance is the larva of the African tumbu fly (*Cordylobia anthropophaga*), an "obligatory" parasite of certain mammals (including man), to the natural history of which the senior author, in collaboration with Thompson, has already made a most sufficing contribution (see this *Bulletin*, Vol. 21, p. 150). In order to develop, the larva after leaving the egg has sooner or later to penetrate into the subcutaneous tissue of a living host where it feeds until it is full grown (usually about a week) when it leaves its host in order to pupate.

The experiments of which the remarkably interesting results are here recorded as a succinct preliminary communication were carried on at Sierra Leone; in their course 58 guineapigs (some imported and some local) were used as hosts and 1,650 Cordylobia-larvae of the first instar, the latter in every case being kept under daily observation for a term of six days after being placed upon the skin of a host.

Of 472 larvae placed upon the guineapigs at their *first* experimental infection 231 (49 per cent.) survived to the 6th day; whereas of 1,178 larvae put on at *all subsequent* applications combined, only 78 (7 per cent.) survived to the 6th day. Local guineapigs were much less susceptible to first infection than the guineapigs imported from England (33 per cent. susceptible against 59 per cent.). All this is evidence of a great degree of immunity acquired by previous infection.

The immunity thus acquired is not a general immunity, but is a local immunity parallel, as the authors do not fail to observe, with Besredka's *immunité générale par immunisation locale* in bacteriology (see this *Bulletin*, Vol. 20, p. 678, and Vol. 21, p. 478). No antibodies were to be found in the serum of immunized animals; the injection of blood of immune animals did not impart immunity to non-immune animals; the blood of immunes exhibited no adverse influences or larvicidal properties *in vitro*, complement fixation and precipitin tests were negative. Moreover intraperitoneal and subcutaneous injection of an emulsion of larvae conferred no immunity—rather the reverse.

Furthermore the immunity is at first localized in that particular area of the skin where it was acquired; it persists there for at least 3 months (limit of present investigation) and spreads from that area. Larvae penetrating an immune area are, in the majority of cases, dead within 40 hours, while they are still in the superficial non-vascular layers of the skin. Immune skin grafted on a non-immune animal retains and imparts its immunity; and, conversely, a skin-graft from a normal animal acquires immunity when planted in an immune area. Immunity is reproduced in the new skin that re-covers a denudation of an immune area. Moreover skin-reactions (swelling and redness) are observed only when larvae are penetrating an immunized area of skin.

As suggesting some influence of the circulating fluids apart from local tissue the author noticed larvae still present in living "immune" skin continued to live when the skin was removed and kept at room or at incubator temperature—and lived as long as larvae lying in normal skin so treated.

Both mechanical damage to and malnutrition of the skin were excluded from the causation of these phenomena of immunity. Attempts to break it down, once established, failed.

Though intraperitoneal and subcutaneous injections, as has been said, failed to produce immunity, some success in the artificial production of immunity was obtained when larvae were permitted to penetrate the skin and were then removed, and also by application of emulsions of larvae to the skin.

"Owing to the prominence which is often given to the occurrence of eosinophilia in many infections with metazoan parasites, we attempted to come to some conclusion as regards its significance in immunity to such parasites. In each case our percentage of eosinophils was derived from a count of a thousand leucocytes, and this part of the investigation involved the differential counting of nearly a hundred thousand leucocytes. The conclusions reached were as follows:—

"(*a*) Metazoan infection is not invariably accompanied by eosinophilia.

"(*b*) Immunity against a metazoan parasite may develop without the occurrence of eosinophilia, either general or local.

"(*c*) Intense eosinophilia, either general or local, may exist without any immunity being present.

"(*d*) Intraperitoneal injections of emulsions of third instar larvae reduce the eosinophil percentage.

"(*e*) Subcutaneous injections of, and applications to the scarified skin of, third instar larvae as emulsions increase the eosinophil percentage."

A. Alcock.

LAMBORN (W. A.). **Medical Entomologist's Annual Report for 1925.**—*Nyasaland Protectorate Ann. Med. Rep. for Year ending 31st Dec. 1925.* Appendix I. pp. 28–29.

Lamborn reports on the final outcome of his field experiment to control *Glossina morsitans* in Nyasaland by the agency of the parasitic Hymenopteron *Syntomosphyrum glossinae.* In the earlier stage of his experiment a liberal distribution of the parasite in an extensive area had been followed by a striking increase of parasitized Glossina-puparia in that area. Later observations afforded evidence that Nature was restoring the balance in favour of the fly. "A very fascinating possibility of effecting the control of the fly had been explored, which by itself had hardly proved radical enough, though it might have distinct value as an adjunct to other measures."

The value of prolonged adminstration of arsenic—both by systematic dipping and by way of mouth—to domestic animals as a means of "protective-offence" against tsetse-fly and other blood-sucking arthropods was tested experimentally. The results were quite disappointing.

A survey was made of a tract into which during the past twelve years tsetse-fly has been steadily advancing from Rhodesia, and a programme has been prepared for the treatment of this tract in the manner associated with the name of SWYNNERTON.

Further study of the malaria problem corroborates the conclusion that the annual epidemic is primarily due to a very distinct seasonal increase of *Anopheles costalis* towards the end of the rainy season.

A study of the amount and kind of malaria prevailing at various altitudes among the native population has begun, and, along with it, of the topical distribution of anopheline mosquitoes.

Among other items of mosquito bionomy it is observed that *Stegomyia fasciata* can live and breed on a diet of reptile blood.

The above are the principal items of an interesting and admirably clear and succinct report.

A. A.

GILL (C. A.). **Zoological Nomenclature in Medical Literature.** [Correspondence.]—*Brit. Med. Jl.* 1927. Feb. 19. p. 354.

The writer of this letter protests very pungently against the idolatrous observance of the law of priority in zoological nomenclature within the less fastidious precincts of medical parasitology. As a glaring instance of disrespectful inconvenience he cites the obliteration of the agreeable, familiar, and significant name "Anopheles rossii" by "Anopheles subpictus"—a resuscitated obscurity.

A. A.

NEVEU-LEMAIRE (M.). Essai de mammalogie médicale. I. Les mammifères réservoirs de virus des maladies infectieuses de l'homme. [**Mammalian Reservoirs of Viruses of Diseases Infective to Man.**]—*Ann. Parasit. Humaine et Comparée.* 1927. Apr. 1. & July 1. Vol. 5. Nos. 2 & 3. pp. 143–176; 252–278. [76 refs.] [Faculty of Med., Paris.]

This compilation is the concluding instalment of a catalogue of mammals that are known [to the compiler's satisfaction] to be capable of harbouring microorganisms pathogenous to man. The species are grouped in zoological order and include here the Orders Carnivora, Insectivora, Chiroptera and Primates. The compilation also includes a list, in alphabetical order, of *all* such mammals, and the specific human viruses harboured by each; and, conversely, a list of microorganisms pathogenous to man, and their specific mammalian correspondents; and, finally, a bibliography. This last item considerably increases the value of a compilation which, however, in the present state of our knowledge cannot be comprehensive and must be unripe for compendious treatment.

A. A.

McCulloch (W. E.). **The Incidence of Amoebic and Helminthic Infections in Kano and Katsina Cities, Northern Nigeria.**—*Jl. Trop. Med. & Hyg.* 1927. May 2. Vol. 30. No. 9. pp. 117–119.

Kano is an industrial city of 68,000 inhabitants: Katsina with 17,500, 108 miles away, is agricultural. The author examined 500 natives from 3 groups in Kano, cooks in the Native Administration Prison, prisoners in the Protectorate Prison and inmates of the Native Hospital, in all 149, and 351 patients from the Katsina Native Hospital; none had symptoms pointing to helminthic infection. One stool only was collected, after mag. sulph. if necessary. Two smears in Weigert's iodine solution were examined, one of the surface, the other of the interior of the stool. Faeces negative for ova were re-examined by concentration in strong saline. Tables I and II give the results.

TABLE I.

Results in the Kano Series with Regard to Amoebic Infections.

| | Kano N.A. Prison. | Kano Protectorate Prison. | Kano Native Hospital. | Totals. |
|---|---|---|---|---|
| Number examined ... | 60 | 38 | 51 | 149 |
| | per cent. | per cent. | per cent. | per cent. |
| *Entamoeba histolytica* ... | 56·6 | 23·7 | 21·6 | 36·24 |
| *E. coli* ... ... ... | 23·3 | 42·0 | 31·3 | 28·2 |
| *Endolimax nana* ... ... | 10·0 | — | 2·6 | 4·7 |

TABLE II.

Percentages of Infections in Kano and Katsina Cities.

| | Kano. | Katsina. |
|---|---|---|
| Number of people examined ... | 149 | 351 |
| | per cent. | per cent. |
| *Entamoeba histolytica* ... ... | 36·24 | 11·96 |
| *E. coli* ... ... ... ... | 28·20 | 50·70 |
| *Endolimax nana* ... ... | 4·70 | 6·00 |
| Ankylostomata .. ... ... | 48·32 | 70·00 |
| *Taenia saginata* ... ... | 8·00 | 10·00 |
| *T. solium* ... ... ... | — | 0·28 |
| Ascarides ... ... ... | 14·90 | 23·60 |
| Strongyloides ... ... ... | 2·70 | 4·81 |
| *Schistosoma mansoni* ... ... | 2·00 | 0·85 |
| *S. haematobium* ... ... | — | 0·85 |

The high figure for *E. histolytica* in the N.A. Prison is explained by the fact that there had been a recent outbreak of amoebic dysentery. Comparing the Kano and Katsina figures the high ancylostomiasis record at Katsina is attributable to the heavy farming that goes on within the city walls; moreover the wearing of sandals is more frequent in the wealthier Kano. Ascaris infection also is commoner in Katsina. Kano on the other hand has the pre-eminence in histolytica infection. *T. solium* infection is rare because the people are Mohammedan, but *T. saginata* is practically universal; much of the meat eaten is in the raw state. Thick film blood preparations of 164 cases revealed microfilaria in one instance only. Guineaworm infestation is common in both towns; " a really successful mode of treatment has yet to be found." In his conclusions the author indicates the futility of generalizing as to the percentage infestation of a country from a few cases in one town, and notes that Europeans in Mohammedan areas should have their servants examined for cysts of *E. histolytica,* for in the epidemic mentioned a European master contracted infection from his cook.

The author's account of a peculiar feature of 17 cases of ancylostomiasis will be noticed in its appropriate place.

A. G. B.

FEDULOW (A. W.). [Ueber die Verbreitung der Darmprotozoa in Turkestan.] **[Distribution of Intestinal Parasites in Turkestan.]**—*Pensée Médicale d' Usbekistane.* Taschkent. 1926. Vol. 1. No. 1. pp. 5–11. [12 refs.] [In Russian.]

In stools from 100 diarrhoeic cases in the hospitals of Tashkent, the author found the following Protozoa :—

| | per cent. | | per cent. |
|---|---|---|---|
| *Entamoeba histolytica,* active | 6 | *Endolimax nana* ... ... | 4 |
| *Entamoeba histolytica,* cysts | 2 | *Trichomonas intestinalis* | |
| *E. coli,* active ... ... | 9 | (= *T. hominis* | 26 |
| *E. coli,* cysts... ... ... | 5 | *Chilomastix mesnili* ... | 8 |
| " *E. hartmanni* " ... ... | 16 | *Giardia intestinalis* ... ... | 14 |
| " *Entamoeba,* n. sp." ... | 4 | *Prowazekia* (= *Bodo*) ... | 14 |
| *Vahlkampfia* ... ... | 2 | *Balantidium coli* ... ... | 2 |
| | | *B. minutum* ... ... ... | 1 |

*Iodamoeba* and *Dientamoeba* have never been observed.

" *Entamoeba* n. sp.," described by the author elsewhere, is here defined as follows. Size 12–13$\mu$. Peripheral chromatin arranged in the nucleus in the form of two crescents connected by a fine chromatic filament. Karyosome very small (punctate). " Chromidial masses " absent in active forms. Cysts uninuclear, with glycogen vacuole. [As this amoeba is said to be allied to " *E. hartmanni,*" it would appear that, like the latter, it is another name for *E. histolytica.* The author, however, emphasizes the independence of both these forms.]

" *Balantidium minutum,*" is said to differ from *B. coli* in general dimensions and in the greater length of its " cytostome " [peristome?].

C. A. Hoare.

TER-MATEVOSIANTS (S. M.). **[On the Incidence of Intestinal Protozoa among the Inmates of a Home for Children.]**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 2. pp. 83–94. [In Russian.]

Reports of examinations of faeces of 83 such children in Erivan (Armenia). A single examination revealed Protozoa in 55·4 per cent.; on re-examination the percentage rose to 72·3. No clinical symptoms were observed in any of them. The findings were distributed as follows:—

| | per cent. |
|---|---|
| *Entamoeba coli* (cysts and precystic) ... ... | 42·2 |
| *E. histolytica* (cysts and precystic) ... ... | 20·5 |
| *Endolimax nana* (active and cysts) ... ... | 18·0 |
| *Giardia intestinalis* (active and cysts) ... ... | 24·0 |
| *Trichomonas intestinalis* [=*hominis*] ... | 16·8 |

C. A. Hoare.

Ukil (A. C.). **An Analysis of 1200 Samples of Stools received at the Laboratory, Calcutta.**—*Calcutta Med. Jl.* 1927. Jan. Vol. 21. No. 7. pp. 346–347. [1 ref.]

This analysis of 1,200 samples of stools [number of individual examinations not stated] showed the following results :—

Blood and mucus were present in 254. *E. histolytica* was found in 187 (associated with other organisms in 35 of them). Charcot-Leyden crystals in 25. Trichomonas and Tetramitus in 115. *Giardia intestinalis* in 79, and with other associations in 7 more. Shiga bacillus in 43. Flexner bacillus in 13. *B. typhosus* was isolated in 6, and *B. paratyphosus* A in 1. Other Gram-negative and lactose-non-fermenting bacilli in 120, of which 105 were isolated from typical cases of acute bacillary dysentery, 10 from chronic or subacute cases, and 5 from stools of normal appearance. Streptococci and enterococci in 55. Yeast cells in 15. *Ankylostoma duodenale* in 10. *Ascaris lumbricoides* in 8. *Trichocephalus dispar* in 5. *Oxyuris vermicularis* in 3. Strongyloides in 1. *Taenia saginata* in 1. *Hymenolepis nana* in 2, and *H. diminuta* in 1.

A. A.

Ukil (A. C.). **The Naked Eye and Microscopic Appearance of Stools containing Flagellates.**—*Calcutta Med. Jl.* 1927. Jan. Vol. 21. No. 7. pp. 348–349. [4 refs.]

This note is based on an examination of 201 samples of stools in which by critical search flagellates *alone* could be found.

In 115 instances the only organisms to be found were of " the Trichomonas and Tetramitus group." In 59 of these 115, the stool was an offensive, light-greenish-yellow liquid inspissated with mucus, and contained some pus cells and (in 12 cases) red blood cells ; in 14 others it was merely a yellowish liquid ; in 28 others it was merely soft or semi-liquid ; in 7 others it was soft and contained mucus and few pus or red blood cells ; and in 7 it was " formed."

In 79 instances the only organism to be found was *Giardia intestinalis*. In 13 of these 79 the stool was " formed " ; but the characteristic stool in the majority was soft, greyish-white, and pultaceous or (12 cases) frothy ; pus was present in 4, mucus and pus in 9, and red blood cells in 2.

The author has merely analysed the stools as received in the laboratory, and reserves his opinion as to their pathogenous significance.

**A. A.**

Paulson (Moses) & Andrews (Justin M.). **The Detection and Incidence of Human Intestinal Protozoa by the Sigmoidoscope.**—*Jl. Amer. Med. Assoc.* 1927. June 11. Vol. 88. No. 24. pp. 1876–1879. [8 refs.]

Comparing results between faeces obtained by sigmoidoscope and by defaecation the authors found the incidence of intestinal Protozoa to be from 2½ to 3½ times higher by sigmoidoscope, and they therefore advocate the use of this instrument in examinations for parasites. The parasites observed were *Entamoeba coli, Iodamoeba williamsi,* *Endolimax nana*, Giardia (Lamblia), *Chilomastix mesnili*, and *Trichomonas hominis*; the absence of *E. histolytica* being emphasized. The occulting effects of barium sulphate in these examinations of faeces are noted, and the value of supplemental serum-saline-citrate culture for flagellates.

**A. A.**

DESCHIENS (R.). Sur les protozoaires intestinaux des singes. [**Intestinal Protozoa in Monkeys.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 19–23 [1 ref.]

This author has found intestinal Protozoa in 70 per cent. of the monkeys he has examined and in every one of 7 chimpanzees, amoebae being found more often than flagellates. Among finds that he believes to be novel are Endolimax, Chilomastix (a variety of *C. mesnili*) and *Trichomonas anthropopitheci* (n. sp.) in the chimpanzee; Giardia in Macacus; and Endolimax and Giardia in Cercopithecus.

A. A.

TALIAFERRO (William H.). **Host Resistance and Types of Infections in Trypanosomiasis and Malaria.**—*Quarterly Rev. Biol.* 1926. Apr. Vol. 1. No. 2. pp. 246-269. With 8 text figs. [53 refs.]

This paper is a long argument described by the author as " essentially a summary " ; here, therefore, no more can be done than follow the line of argument.

The author's desire is to investigate the processes of acquired immunity as they can be followed by observations of the parasite—a line of study feasible in certain trypanosomes and plasmodia that " complete their life-cycle in the blood." When such parasites invade the blood, if they meet with no resistance they may be assumed to increase in geometrical progression. But the host may resist either by killing some of the parasites as they are formed, or by checking their rate of multiplication—or, as the author terms it, " reproduction." The first method of resistance can be estimated by serial observations of the numbers of the parasites; the other method by observations of their mean size. In the rat, for instance, *Trypanosoma lewisi* encounters both kinds of resistance, the direct, phagocytic or, more probably, trypanocidal, resistance being manifested in recurrent " number crises " ; but each number crisis is so much gained by the host because the rat first produces an antibody which completely inhibits reproduction (cell division) in the parasites. The case of *T. lewisi* thus, it is thought, may help to explain how a pathogenous trypanosome like *gambiense* may remain a harmless convival of the antelope and be pathogenous to other hosts even although those hosts can produce a trypanolysin; for all the parasites will not be killed by the trypanolysin and those that remain can continue, in the absence of a " reproduction-inhibiting reaction product," to reproduce at a uniform rate.

" In the malaria parasite of birds a marked parasiticidal effect of resistance is manifested both at definite number crises and throughout the latter part of the infection. This is, however, not associated with any inhibition of the reproduction of the parasites. The immunological basis for the parasiticidal effects are not definitely known."

A. A.

**Wolff** (Etienne). Un facteur de l'enkystement des amibes d'eau douce. Prolongation expérimentale de la période *végétative*. [**A Factor of Encystment of Fresh Water Amoebae.**]—*C.R. Soc. Biol.* 1927. Mar. 11. Vol 96. No 9. pp 636–63[illegible]. With 1 text fig.

The experiments here quite insufficiently described were designed to give some precision to the postulate that encystment of free Protozoa is a reaction to unfavourable circumstances, particularly to inanition. In " pure " cultures of a species of freshwater amoeba (Hartmanella) upon a nutritive medium containing a bacterium of the *fluorescens* group, encystment of the amoeba began in 10 to 15 days and became general several weeks afterwards; but if the amoebae were starved—by changing the nutritive medium for sterile water at the 7th day of culture—encystment was much hastened. On the other hand by frequent renewal of the nutritive medium, without removing the sterile water (which is now required to exercise its purifying effect) encystment could be retarded for a long time.

A. A.

Allen (Ena A.). **Excystment of** *Councilmania lafleuri* **Kofoid and Swezy in Culture in Vitro.**—*Univ. California Public Zool.* 1926. Oct. 4. Vol. 29. No. 8. pp. 175–178. With 28 text figs. [5 refs.]

The excystment of " *Councilmania lafleuri* " is here described and figured. " Excystment took place in Ringer's solution plus 0·1 per cent. of dextrine only, and not in any of the other media used." In sediment from two subcultures some empty cysts, showing the typical " pore " were seen.

A. A.

Wenrich (D. H.) & Yanoff (Jacob). **Results of Feeding Active Trichomonad Flagellates to Rats.**—*Amer. Jl. Hyg.* 1927. Mar. Vol. 7. No. 2. pp. 119–124. [8 refs.]

Employing Hegner's methods, the authors observed that from rats fed with caecal matter containing active flagellates taken from other rats the active flagellates could be recovered, from one to two hours afterwards, in the stomach and intestine. They conclude, therefore, that these flagellates (a " Pentatrichomonas " and 3 species of " Tritrichomonas ") can infect fresh hosts without undergoing encystment; and since they cannot distinguish the " Pentatrichomonas " of the rat from that of man they also conclude that the rat may be regarded as a reservoir for man.

A. A.

Pavia (Giovanni). *Trichomonas intestinalis—buccalis—vaginalis.* Loro eventuale patogenicita. [**Species of Trichomonas: their Pathogenicity.**]—*Arch. Ital. Sci. Med. Colon.* 1926. Nov.-Dec. Vol. 7. No. 11–12. pp. 227–239. [23 refs.]

This is a good review of a familiar ground. The author has no doubt that *Trichomonas intestinalis* is pathogenous. He recites the associated symptoms, and recommends stovarsol, yatren, and turpentine in treatment. He is not quite so certain of the pathogeny of *T. buccalis* and *vaginalis.*

A. A.

MARX (Hans). Ueber den pathologisch-anatomischen Nachweis von Trichomonas pulmonalis bei putrider Bronchitis. [**Presence of T. pulmonalis in Putrid Bronchitis.**]—*Schweiz. Med. Woch.* 1927. May 21. Vol. 57. No. 21. pp. 487–488. [5 refs.]

The author describes the pathological findings in a fatal case of putrid bronchitis with other pulmonary complications in which Trichomonas had been present in the sputum. His verdict is that the flagellate had no pathological significance; possibly its first entry might have occurred a few days before death.

A. A.

INFURNA (Giuseppe). Frequenza dei flagellati intestinali specialmente negli adulti in provincia di Bologna. Loro eventuale patogenicità. [**Frequency of Intestinal Flagellates in Adults of the Province of Bologna.**]—*Arch. Ital. Sci. Med. Colon.* 1926. Sept.-Oct. Vol. 7. No. 9–10. pp. 185–201. [11 refs.]

In 2,883 specimens of faeces examined, from Bologna and provinces, *Giardia intestinalis* was found in 4·85 per cent. of cases, being associated with other common intestinal parasites in 2·53 per cent. The author considers Giardia to be pathogenous for man, causing abdominal pains, anaemia, and diarrhoea often alternating with constipation. The treatment is stovarsol in doses of 0·50–0·75 gm. daily for 15–20 days. Among the 2,883 cases *Trichomonas intestinalis* was present in 4·49 per cent., being associated with other organisms in 3·96 per cent. The author thinks that it also is to a certain extent pathogenous—especially when it is abundant—in the same way as, though less troublous than, Giardia. *Chilomastix mesnili*, which was found in 3·25 per cent. of the 2,883 cases, he considers distinctly pathogenous because it can eat red blood cells. In treating these two infestations he recommends, in addition to familiar internal remedies, washing out the gut with medicated enemata. [Beyond the local statistics there is nothing very novel here.]

A. A.

ZAHORSKY (John) & MCLOON (Mary). **Giardiasis in Children. Report of Three Cases.**—*Jl. Amer. Med. Assoc.* 1927. Feb. 5. Vol. 88. No. 6. pp. 385–388. [13 refs.]

Three cases are here reported—a boy of 6 years, and twin-four-months' infants that apart from the breast had been fed only with sweetened condensed milk—where the stools contained Giardia cysts. In the first case there was diarrhoea, in the other two cases there was first diarrhoea and then constipation and the stools also contained pus cells. The reporters hold that "Giardiasis has a definite clinical importance, since the Giardiae in infants and young children produce a distinct irritation of the intestinal tract which may result in malnutrition and secondary intestinal infections." After earlier ineffectual treatment the reporters adopted WENYON's device of bismuth salicylate and found it "effective in improving the clinical condition"; the cysts also disappeared.

A. A.

HEGNER (Robert). **Excystation and Infection in the Rat with *Giardia lamblia* from Man.**—*Amer. Jl. Hyg.* 1927. July. Vol. 7. No. 4. pp. 433–447. With 18 figs. [9 refs.] [Sch. of Hyg. & Pub. Health, Johns Hopkins Univ.]

The following summary by the author expresses very concisely the range and the results of the experiments described in this paper:—

"*Excystation.* The available descriptions of excystation in any species of giardia are the somewhat inconclusive accounts of Simon (1921) and Hegner (1925) of *G. lamblia* in the feces of a human host.

"Twenty-eight rats were used in the experiments described. From 3 cc. to 6 cc. of washed cysts of *G. lamblia* from man, were injected into the stomach of rats from 30 to 70 hours after they were passed in the feces. The rats were killed and examined from 20 minutes to 4½ hours after being injected.

"In two rats, full-sized *lamblia*-like giardias were found; these could not have been newly excysted specimens and hence probably belonged to the species called by Lavier (1924) *Giardia simoni*. *G. simoni* is probably the same species as *G. lamblia.*

"The minimum time required for excystation to occur under the conditions of the experiments was about 30 minutes.

"Excystation did not occur in the stomach or duodenum, but mostly from 30 cm. to 60 cm. posterior to the stomach. The excysted specimens appeared to remain in this location whereas unexcysted cysts were carried down to the caecum.

"Not all of the cysts injected excysted; those that did not were probably immature or dead.

"The factors that are responsible for excystation probably include a temperature of about 37° C. and moisture, and possibly certain digestive juices.

"The process of excystation appears to be as follows: The organism is stimulated to activity within the cyst; the cyst wall weakens at the posterior end; the posterior flagella break through at this point and by their activity draw the rest of the organism out of the cyst wall.

"Division of the organism into two begins before excystation and is completed afterward. The nuclei within the cyst are 4 in number located at one end; the axostyles and other internal structures are duplicated; division begins at the anterior end and proceeds posteriorly; the pairs of nuclei do not separate and become located at opposite ends before division as previously described. The young trophozoites are smaller than fully-grown specimens; they are at first irregular in shape; later they assume the adult shape and a sucking disc appears.

"*Infection.* Previous attempts by Simon (1922) and Lavier (1924) to infect rats with *G. lamblia* from man have been unsuccessful.

"Ten rats were fed washed cysts of *G. lamblia* from man on 11 of 12 successive days, and killed at intervals during the succeeding 19 days.

"Temporary infections were apparently established in 4 rats; these infections were highest on the 6th and 7th days, decreased by the 12th and 14th days, and disappeared by the 16th and 19th days. The trophozoites recovered from these animals were smaller than those of *G. lamblia*; this may have been due to their unusual habitat.

"The distribution of the giardias differed from that of *G. muris*; the latter are most abundant in the duodenum, whereas the trophozoites of *G. lamblia* were absent from the duodenum and most numerous in the small intestine from 40 cm. to 90 cm. posterior to the stomach.

"No cysts were passed by the experimentally infected rats, which indicates that *G. lamblia* does not encyst in the rat; the rat is, therefore, not an important transmitting agent of this species."

A. A.

PESSOA (Samuel B.) & CORRÊA (Clovis). Sobre a disseminação de cystos de *Giardia intestinalis* (Lambl.) pelas baratas. **[Dissemination of Giardia Cysts by Cockroaches.]**—*Rev. Biologia e Hyg.* São Paulo. 1927. Vol. 1. No. 1. pp. 90–92. English summary p. 93. [7 refs. ]

Three species of cockroaches are common at S. Paulo, two of them being the small " German " cockroach and the large red " American " cockroach. These insects both in the larva and adult stages can distribute living cysts of *Giardia intestinalis* by defaecation, and also by regurgitation (experimentally). A few live cysts could be found even 7 days after their ingestion, though the greatest number was found 48 hours after ingestion.

A. A.

ADAMOWICZ (Pawet). [Sur l'infection du duodénum et des voies biliaires par "Lamblia intestinalis."] **[Duodenal Infestation by** *L. intestinalis.*]—*Polskie archiwum medycyny wewnetrznej.* 1926. Vol. 4. p. 2. [Summarized in *Bull. Inst. Pasteur.* 1927. May 15. Vol. 25. No. 9. pp. 428–429.]

In 57 cases where he examined the contents of the duodenum the author recognized *Giardia intestinalis* in 7. In 5 of these seven there were biliary troubles ; in 1 there was chronic enteritis ; and in 1 pernicious anaemia without any manifest disturbance of the digestive tract. In only one of these cases was any evidence of the Giardia infection discovered in the faeces—cysts. This last fact makes it imperative, in the author's opinion, to examine the contents of the duodenum in cases of chronic diarrhoea with concomitant symptoms of hepatic or intestinal derangement.

As regards the presence of Giardia in the bile channels, the author thinks that although they do not cause any appreciable anatomical changes they may obstruct the ducts mechanically by their very multitude, and in nervous subjects may cause pain and spasms by their movements, and that in the gall-bladder their dead bodies may favour the formation of concretions.

A. A.

SOFIEW (M. S.). Ueber duodenitis bei Darm-Lambliose. **[Duodenitis in Gut Lambliasis.]**—*Pensée Méd. d' Usbekistane.* Taschkent. 1927. Vol. 1. No. 3–4. German summary p. 228. [In Russian pp. 28–30. With 2 text figs.]

An obstinate recurring case of intestinal lambliasis with pain in the epigastrium and symptoms of gastritis ; palpation caused sharp pain in duodenal region' In the duodenal contents were found numerous pus cells, much mucus, and many Lamblia free and encysted. A combination of emetine, neosalvarsan, and methylene blue therapy was followed by distinct improvement, but Lamblia cysts persisted in duodenal contents. Nine months later the patient returned with recurrence of former symptoms and physical signs, and with Lamblia in duodenal contents and in faeces.

H. M. H.

JASSINOWSKY (M. A.). Ueber die Anzahl der Parasiten bei der Lambliose der Kaninchen. **[On the Numbers of the Parasites in Lambliasis of the Rabbit.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Apr. Vol. 31. No. 4. pp. 191–193.

In the course of an investigation of the wandering of the leucocytes in the intestinal tissue of the rabbit some subsidiary observations were made of the number of parasites present in the gut of an animal found to be infested with Lamblia (Giardia). A piece of the lower part of the *jejunum* 17 cm. long was isolated and washed out (five successive measured washings each of 5 minutes duration) in the manner here described in detail and the total number of parasites is calculated from observation of the number counted in 1 cmm. of each washing. The number was 37,625,000, of which 10,830,000 were calculated in the first measured washing. From the normal relations of the leucocytes in this case it is inferred that the rabbit was not suffering from any disease.

A. A.

DA FONSECA (O.). Sobre o flagellado "*Enteromonas hominis.*" [**The Flagellate** *Enteromonas hominis.*]—*Bol. Inst. Brasileiro de Sci*, Rio de Janeiro. 1927. Apr. 24. Vol. 2. No. 12. pp. 363–365. With 7 figs.

A brief description of the multiplication of this flagellate by binary fission is given, with illustrated figures. The hypothesis that they might be young forms of Chilomastix is held to be inadmissible, because they are frequently encountered in individuals harbouring no other protozoal species.

H. Harold Scott.

RODHAIN (J.). Phytoflagellé du latex d'une asclépédiacée Congolaise. [**Flagellate of a Congolese Asclepiad.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Dec. Vol. 6. No. 3. pp. 271–274. With 1 text fig. [4 refs.]

Description and figures and list of localities of observation of a Leptomonas (akin to the *L. elmassiani* observed in an American Asclepias) of common occurrence in an African Asclepiad, *Daemia extensa.*

DICKINSON (R. F. O'T.). **A Plant Flagellate in Mauritius.**—*Jl. Roy. Army Med. Corps.* 1927. June. Vol. 48. No. 6. pp. 454–455.

Reports the finding in the latex of *Euphorbia pillulifera* in Mauritius of a flagellate apparently identical with the one found by R. P. STRONG in the same species of Euphorbia in tropical America. Quotes the results of STRONG's experiments with this flagellate (see this *Bulletin,* Vol. 22, p. 275).

AUBERTOT. La flagellose des euphorbes dans l'Est de la France. [**Flagellosis of Euphorbias in the East of France.**]—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 14–19. [12 refs.]

The author has found Euphorbias infected with *Leptomonas davidi* in all parts of France where he has looked for it. The latex of infected plants is usually poor in amidon grains, but the plants do not show any outward and visible signs of infection. Phytophagous Hemiptera are always concurrent.

A. A.

MONASTRA-ABATE. Distribuzione del *Trypanosoma lewisi* nei ratti di diverse località di Bologna e Dintorni. Ricerca di eventuali altri parassiti. [**Distribution of** ***T. lewisi*** **in Rats from Different Districts of Bologna and its Environment ; Examination for other Parasites.**]—*Arch. Ital. Sci. Med. Colon.* 1927. Mar. Vol. 8. No. 3. pp. 131–149.

Sixty-three sewer rats were examined and 22 were parasitized. *T. lewisi* was found alone in 14, with helminths in 3, with Haemogregarines in 1; Helminths alone 1, with haemogregarines 1; haemogregarines alone in 2. The last-named were found in the leucocytes. Helminthic infections were *Cysticercus fasciolaris*, *Hymenolepis diminuta*, *Trichocephalus dispar* and *Oxyuris vermicularis*. *Gongylonema* was looked for but not found.

H. Harold Scott.

ANDREWS (Justin M.). **Host-Parasite Specificity in the Coccidia of Mammals.**—*Jl. Parasit.* 1927. Mar. Vol. 13. No. 3. pp. 183–194. [15 refs.]

The following are the author's conclusions from study and from certain experiments of his own:—

"*Isospora felis* and *I. rivolta* from the cat and dog appear to be infective to both animals, though the course of the infection varies in each." With this exception "the coccidia of mammals seem to be strictly host-specific parasites, as judged by cross-infectivity experiments on cats, dogs, rabbits, skunks, opossums, pigs, and prairie-dogs." Excystment "is facilitated by the digestive processes of the natural host . . . but in the foreign host oocysts are so resistant to digestive action that the sporozoites are not released during the normal length of time that the organisms pass through the intestine."

A. A.

AZIM (M. A.) & CAIRO (S.). **The Oöcysts of a Coccidium in the Faeces of Laboratory and Wild Rats.**—*Proc. Roy. Soc. Med.* 1927. Mar. Vol. 20. No. 5. pp. 701–704 (Sect. Trop. Dis. & Parasit. pp. 19–22). With 6 text figs. [21 refs.]

The authors describe and figure Coccidium oocysts, either ovoid or broadly elliptical, found by them in faeces of white rats and afterwards in some London dock rats—most often in young rats. Neither vegetative forms nor naked-eye lesions were detected in the intestine of several rats killed and examined. At room temperature the oocysts ripened in 6 or 7 days, then revealing 4 oval sporocysts (each containing 2 sporozoites) and absence of residual protoplasm. The sporocysts are 8·5 $\mu$ to 1·5 $\mu$ in the major and 6 $\mu$ to 6·8 $\mu$ in the minor diameter; the sporozoites are blunt at one end and taper to a point. The important question whether the oocysts be specific to the rat or derived (as THOMSON and ROBERTSON have shown to be the case in some of the species of oocysts found in faeces of Man) from its animal food is fully discussed; "so far all attempts to demonstrate a development in the intestinal epithelium of the rats have failed"; but the authors have demonstrated that oocysts of the rabbit coccidium can pass unaltered through the alimentary canal of the rat. Prior observations of Coccidium oocysts found in rats are considered (with references to original papers).

A. A.

YAKIMOFF (W. L.), GALOUZO (J. G.), RASTÉGAÏFF (E. F.) & LOUKIANOFF (W. A.). A propos de la coccidiose des porcs en Russie. [**Coccidiosis of Pigs in Russia.**]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 215–218. [1 ref.]

Draws attention to the prevalence of coccidiosis in pigs brought to the Petrograd abattoirs from the Crimea. Two kinds of oocysts have been observed.

A. A.

HARTMAN (Ernest). **Certain Interrelations between** ***Plasmodium praecox*** **and its Host.**—*Amer. Jl. Hyg.* 1927. July. Vol. 7. No. 4. pp. 407–432. With 8 figs. [12 refs.] [Sch. of Hyg. & Pub. Health, Johns Hopkins Univ.]

This paper deals with certain biometric studies on *Plasmodium praecox* in the canary. The following are its conclusions :—

" 1. During the rise of the infection in the canary the asexual parasites continue to die throughout the cycle. This mortality rate is during 21 hours a mathematical constant, as determined by the fit of the data to an exponential curve.

" 2. Some birds show significant differences in mortality rates of the parasites, and it is suggested that each succeeding asexual generation may have a different mortality rate.

" 3. The findings of Taliaferro (1925) on a constant rate of increase in numbers of parasites from day to day until near the peak of the infection, are confirmed. However, considerable variation in rates occurs in different birds.

" 4. Some cases (probably those not complicated by a drop in red cell count) show a constant rate of decrease of the infection.

" 5. From these data it appears likely that the numbers of malarial parasites present at corresponding times in succeeding asexual cycles describe an autocatalytic population curve

" 6. Relapse shows the same characteristics of constant rates of increase, and of decrease, without treatment as are exhibited by primary attacks. Relapse may be either more severe or more mild than the initial attack. Thus primary attack and relapse are identical in type of infection, although relapse in bird malaria is usually more mild.

" 7. Symptoms in the bird follow sporulation and peak in numbers and seem to be the direct result of some activity of the parasite or of its decomposition.

" 8. When the parasites are numerous, their size at a given time of day is smaller than either before or after that time when their numbers are fewer. But, whether reduction in size regularly occurs when a certain degree of infection is reached is not known.

" 9. Growth of asexual parasites proceeds at a constant rate from the earliest time measurements have been secured on the population varying in age, to about the time when sporulation begins. It is possible that this growth period may fit that part of an autocatalytic growth curve which can be approximately fitted with an exponential curve.

" 10. The data secured are discussed in reference to the similarity between the relations of host and parasite and the relations of free-living animals and their environments. It is suggested that the host-parasite relationship is on a chemico-physical basis, and that both host and parasite react in the same way in which they would if the stimuli came from a non-living source."

A. A.

HASSELMANN (Gustavo). Alterações patologicas do myocardio na Sarcosporideose. [**Pathological Changes set up in the Myocardium by Sarcosporidia.**]—*Bol. Inst. Brasileiro de Sci.* Rio de Janeiro. 1926. Sept. 14. Vol. 2. No. 9. pp. 310–326. With 12 text figs.

The author first found Sarcosporidial cysts in the heart of an ox in 1915, and during the ensuing eleven years he examined hearts of another 300 animals from the different States of Brazil and found them in every one. The animals were all in good condition and passed as fit for food. The parasite was found only in the heart-muscle. (He believes it to be a new species, and calls it *Miescheria cruzi*). Its effect on the muscle-fibres is to cause atrophy and rupture. The affected fibres stain poorly and lose their striation, and show a round-celled infiltration with lymphocytes, large mononuclears and some fibroblasts. The interstitial tissue and the vessels reveal similar infiltration. (Similar changes are also present in trichiniasis and in Chagas's disease.) The effects are due, not only to pressure, but in part also to the action of the well-known toxin—sarcocystin. No clinical heart signs were observed, even though at autopsy the cysts were discovered actually involving some of the fibres of the bundle of His.

H. Harold Scott.

BATTISTINI (T.) & WEISS (P.). Contribución al estudio de la *Bartonella muris.* [*Bartonella muris.*]—*An. Facul. de Med.* Lima. 1926. Vol. 9. Nos. 1, 2 & 3. pp. 71–80. With 3 figs. on 1 plate.

In blood of some rats in Lima the authors found intracorpuscular Bartonella bodies. If splenectomy were performed an intense anaemia ensued, the red cells were reduced from 7 million or less, with leucocytosis in the neighbourhood of 50,000 and some erythrophagy by large mononuclears.

Whereas *Bartonella bacilliformis* of Oroya fever varies in shape and size, this *B. muris,* of which there may be from 8 to 19 in a single cell, is rod-shaped and practically of one size.

The authors obtained the " bodies " in pure culture by the process they employed for *B. bacilliformis* in 1920, but failed in transmission experiments to other laboratory animals.

H. Harold Scott.

DE FARIA (Gomes) & CRUZ (Oswaldo). Sur les localisations viscérales de *Bartonella muris* (Carini). [*B. muris* **in the Viscera.**]—*C.R. Soc. Biol.* 1927. Feb. 25. Vol. 96. No. 7. pp. 489–491. With 3 text figs.

In studying the pernicious anaemia of rats that have suffered splenectomy the authors have encountered rats infected with *Bartonella muris,* and they are inclined to agree with LAUDA and MAYER that this may be the organism which, becoming active in certain circumstances (e.g., after removal of the spleen, or in intoxication with " Bayer 205 "), is at the bottom of this pernicious anaemia of rats. They have found the Bartonella in the hepatic capillaries, in the cells of Kupfer, and in the liver cells (where sometimes they resemble Rickettsia clumps), also in the capillaries of the lungs both free and engulfed in macrophages. For studying the organism they recommend the iron-haematoxylin stain.

A. A.

NAUCK (E. G.). Ueber Befunde im Blut splenektomierter Nager. [**Observations on the Blood of Splenectomized Rodents.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. July. Vol. 31. No. 7. pp. 322–329. With 7 text figs. [Peking Union Med. Coll.]

The author describes and figures Grahamella and also certain extracellular coccoid and bacillar bodies found in the blood of anaemic splenectomized rodents. He does not consider his observations ripe enough to justify any final conclusions as to their significance in connexion with anaemia, though they are consistent with the view that rodents may normally harbour infections that remain latent as long as the spleen is intact.

A. A.

SCHWETZ (J.). Contribution à l'étude des moustiques d'Elisabethville et de quelques autres localités du Katanga (Congo belge). [**The Mosquitoes of Elizabethville.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 170–192. With 1 map in text. [3 refs.]

In the course of a survey of Katanga for other purposes the author had an opportunity of making a careful study of the mosquitoes of Elizabethville and also took some notice of the mosquitoes of other parts of the country. In Elizabethville, where breeding-places (both natural and otherwise) are " not wanting," he identified, by capture of adults and breeding of larvae, 34 species including 11 Anopheles. During the dry season (May–November) mosquitoes are seldom to be seen in houses, those that are occasionally found being *Culex fatigans*, *Anopheles costalis* and *A. funestus* and larvae of Anopheles are very hard to find anywhere. During the wet season (November-April) Anopheles larvae are plentiful, and *Culex fatigans*, *Anopheles costalis* and *A. funestus* are to be found in all the houses; *Aëdes argenteus* (*Stegomyia fasciata*) is not so common as in many other parts of the Congo, however. In addition to the two already named, the following species of Anopheles were observed by the author: *implexus*, *maculipalpis*, *mauritianus*, *squamosus*, *pitchfordii*, *transvalensis*, *wellcomei*, *pharoensis*, and *theileri* at Elizabethville and its environs, and away from Elizabethville *distinctus* and *kingi* in addition. The author gives lists, with precise localities and particulars as to abundance, of all the species of Culicidae observed by him at Elizabethville and in other places in Katanga.

A. A.

FREEBORN (Stanley B.). **The Mosquitoes of California.**—*Univ. California Public. Entom.* 1926. Mar. 24. Vol. 3. No. 5. pp. 333–460. With 41 text figs. [31 refs.]

The mosquitoes of California are represented by 32 species and are included in 5 genera. In this full and lucid taxonomic survey are to be found not only succinct and diversified keys and full and clear individual definitions of the genera and species, but also much strictly relevant information regarding the habits, breeding, range, and characteristic peculiarities of individual species; furthermore, there is an abundance of large clear text-figures, all very much to the point. In the general preliminaries the author defines the Mosquito family as excluding the Chaoborines (Corethrines) and as compact of two subfamilies—Culicinae and Anophelinae, the Sabethes group being included with the Culicines.

A. A.

MACKERRAS (I. M.). [**The Mosquitoes of the Sydney District.**]—*Aust. Nat.* 1926. Oct. Vol. 6. Pt. 3. pp. 33–42. [Summarized in *Rev. Applied Entom.* 1927. Apr. Vol. 15. Ser. B. Pt. 4. p. 60.]

Among the 28 species of mosquitoes of the Sydney district are *Anopheles annulipes*, *atratipes*, and *stigmaticus*, but not *Aëdes argenteus* (*Stegomyia fasciata*). It is said that only two cases of malaria are definitely known to have occurred. The author therefore thinks that the expense and inconvenience of antilarval measures are hardly justifiable in the district.

A. A.

LESTER (A. R.). **The Coconut Palm. Its Potentialities in providing Breeding Places for Mosquitoes.**—*Jl. Trop. Med. & Hyg.* 1927. June 1. Vol. 30. No. 11. pp. 137–145. With 9 figs. on 1 plate. [5 refs.]

The copious details of this very careful investigation cannot be contracted, but its summarized conclusions are given in full. It must be added that in the course of his investigations the author employed two native climbers who had been trained by and had worked with the man who produced water and mosquito larvae from coconut palms for Dr. HAWORTH, and that these men could not now produce them from this source. The pertinent information is added that the expert employed by Dr. HAWORTH could not be secured, and that it was alleged that he had recently served a term of imprisonment for theft.

"To summarize, it was found that with a negligible proportion of exceptions, no water lodges in the open hollows of basal leaves in natural conditions for longer than an hour. In the few cases where water was retained for over twenty-four hours artificial conditions were maintained. In the artificial and more or less ideal conditions in which experiments on cut leaves were made, water stood for under 60 hours. It is considered unlikely that such ideal conditions occur frequently in nature. Fluid is undoubtedly retained in the crown of the palm, but has hitherto been noticed only at the bases of mesial leaves. Many mesial leaves present dampness. The amount of fluid collected from these sources has varied between a few drops and 56 cc. from a single leaf. The fluid is found more frequently and in larger amounts shortly after rain. The fluid can be retained for at least 21 days. It is conceivable that this period could be lengthened, bearing in mind the fact that it is contained in an enclosed space, from which it has displaced air, and evaporation is consequently retarded. The quantity absorbed by the living plant remains open to investigation. The swaying of leaves in a breeze of ordinary velocity is naturally most marked at their distal ends, and does not break the contiguity of stem and mid-rib of mesial leaves. That the fluid retained is water—rain or dew or both—is considered probable. The minute remains of organic matter detected are probably derived from the fibrous bracts in course of percolation, and from the raw surface of the perforation through which the water flows in collection. A very much fainter trace of organic matter was detected when two borers, fitting one another closely, were employed. A mallet was required to secure a perforation when using two and, on removal of the inner tube, water flowed through the outer. The amount and frequency with which water is struck in mesial leaves appears to bear a close relation to the rainfall. The theory that this fluid is a secretion or excretion of the tree is discounted by its composition and the simple physical explanation of its presence. It is difficult to comprehend—though this does not rule out the theory—the purpose of a function relegated to the basal portion of three or four leaves mesially situated, and it is not too much to assume that the fluid would be found with greater constancy in all mesial leaves affording space at their bases if it were an excretion or secretion, or that the amount yielded would bear a more or less constant ratio to the space available and the yield of other leaves on the same plant. Again, the loss of such function when the mesial leaf becomes in turn a basal one requires explanation. The water present in certain leaves is in an enclosed space inaccessible to mosquitoes. Dense opaque white webs frequently guard the approach to such axils and careful scrutiny has failed to reveal a single mosquito entangled in the mesh above or from below. It is to be remarked incidentally that rain water has frequently been found in the axils of leaves corresponding with basal ones in the coco-nut palm, of the pineapple, sisal and allied plants, the travellers' or fan-palm, and the banana-palm. We have not yet found mosquito larvae in any of these. The absence of the necessary pabulum in what amounts to distilled water is a possible reason. There is no apparent structural difference in the leaves or their mode of attachment in a low or tall coco-nut palm. Ollweg infers that anopheles breed in the axils of coco-palms and that it would become important if other breeding places were dealt with. Pomeroy failed to find anopheline larvae, but omits to state whether any other mosquito larvae were discovered. At no time in our investigations, in all conditions of weather, location or altitude, have mosquito larvae been found in the axils or hollows of coconut-palm leaves, though found breeding at all seasons of the year in pools, aqueducts, coconut shells and many other places in close proximity. Natural enemies of the mosquito in its larval stage abound in coconut-palms.

"We feel unable, though, without the assistance of Dr. Haworth's skilled climber, to corroborate his results. If water were present in proportions approaching this observer's figures, in what are understood from his description to refer to basal leaves, it seems hardly possible that it could have escaped observation. The experiments of pouring in water seem to show that only under exceptional circumstances such as long-continued rain or abnormalities of form or attachment in certain leaves, high humidity and still atmosphere, can water be retained for much over 24 hours.

"It is found difficult to reconcile the results attained, and it is felt that, in spite of the careful precautions taken to prevent inaccuracies, the possibility of Haworth's tree climber having been able to ensure his success by artificial means cannot yet be excluded.

"The natural conclusion arrived at from a résumé of our observations is that in present conditions the presence of coconut-palms as presenting a source of breeding for mosquitos does not appear prejudicial to the health of a community living in the vicinity, and that before any drastic measures are taken to deal with such palms, in view of their economic importance, further observations could usefully be undertaken."

A. A.

CLEARE, Jr. (L. D.). **Notes on the Breeding-Habits of Two Mosquitos.**—*Bull. Entom. Res.* 1927. June. Vol. 17. Pt. 4. pp. 405–409. With 1 text fig., 1 plate & 1 sketch plan.

Silting due to outworks against the sea, in the neighbourhood of Georgetown in British Guiana, has naturally been followed by the formation of brackish swamps and shallow pools along the foreshore, the salinity of these pools varying periodically with the occasional encroachment of spring-tides, and seasonally with rainy weather, from 3·8 to 15·3 gm. of salt per litre. Although the higher extremes of salinity are far greater than that which the larvae of *Anopheles tarsimaculatus* have been said to be capable of enduring, larvae of that species have been found in considerable numbers in these pools in a salinity of 11·2 gm. per litre. Numerous natural enemies (including fishes) also flourish in these weedy pools. With the breaking-up of the dry season *Aëdes taeniorhynchus* is also to be found, in swarms, in the same locality.

A. A.

HAMLYN-HARRIS (R.). **Notes on the Breeding-Places of Two Mosquitos in Queensland.**—*Bull. Entom. Res.* 1927. June. Vol. 17. Pt. 4. pp. 411–414. [9 refs.]

Although in townships in Queensland *Aëdes argenteus* breeds in almost any sort of vessel that holds fresh water, its chief breeding-place is the rainwater tank; receptacles containing liquid manure in an exhausted state also are attractive. From the sanitarian standpoint it is suggestive that its larvae may sometimes be found (along with *Aëdes notoscriptus* and *Culex fatigans*) in water-storage made of brick or cement.

*Anopheles annulipes* breeds in waters of many kinds, both natural and artificial—pools, streams, swamps, trickles, water-holes, hoof-prints, etc.; borrow-pits, troughs, water-barrels; also in salt or brackish water, and sometimes in foul water (along with *Culex fatigans*). Its larvae can be found at any time of year, though during the coldest days of winter they have a tendency to hide until the day gets warm. The author notes that the larvae of this species have been found in great abundance in a shallow brook in which the Characeous Nitella was growing.

A. A.

BIANCHI LISCHETTI (Angel). Experiencias sobre la acción de substancias tóxicas sobre mosquitos adultos. [**Action of Poisons on Adult Mosquitoes.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 466–480.

The avidity of adult mosquitoes of both sexes for honey has led the author to try poisoned honey as a destructive bait. The poisons used in experiment were mercury chloride, boric acid, various arsenic salts, and cyanide of potash. The last was the most potent, but its power soon evaporated. The best was arsenite of potash. The honey, though poisoned, did not lose its attraction for the mosquitoes; the females sucked the honey without waiting for an opportunity to suck blood, even when it was placed as an impediment to an attractive animal, and they did not survive long enough to deposit their eggs. [The riskiness of poisoned honey is not considered].

A. A.

ROY (D. N.). **The Physiology and Function of the Oesophageal Diverticula and of the Salivary Glands in Mosquitoes.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 995–1004. With 1 text fig. [9 refs.]

After discussing the observations and conclusions of earlier workers and describing his own technique, the author gives an account of his present experiments. He finds that blood can easily be detected in all three diverticula when the stomach is full, as it will be when a mosquito has continued sucking from 1½ to 2½ minutes. The blood corpuscles suffer no change in the diverticula; therefore these are to be regarded as simple reservoirs. An emulsion of the diverticula (both of male and female) rubbed into a needle-puncture causes a wheal having the circumference of a pea, with surrounding erythema that may be an inch in circumference, the effect being severer than that of an emulsion of the salivary glands. No evidence of an anti-coagulant effect can be found in the secretions either of the diverticula or of the salivary glands.

A. A.

DE BUCK (A.), SCHOUTE (E.) & SWELLENGREBEL (N. H.). Recherches sur l'anophélisme sans paludisme aux environs d'Amsterdam. (**Researches on Anophelism without Malaria in the Territory surrounding Amsterdam.**)—*Riv. di Malariologia.* 1927. Jan.–Feb. Vol. 6. No. 1. pp. 8–39. With 1 map in text. [11 refs.] [English summary pp. 190–191.]

SWELLENGREBEL (N. H.), DE BUCK (A.) & SCHOUTE (E.). **On Anophelism without Malaria around Amsterdam.**—*Koninklijke Akademie van Wetenschappen te Amsterdam. Proceedings.* Vol. 30. No. 1. pp. 61–68. With 1 map in text. [Refs. in footnotes.]

DE BUCK (A.), SWELLENGREBEL (N. H.) & SCHOUTE (E.). **Studies on Anophelism without Malaria in the Vicinity of Amsterdam.**—*Bull. Entom. Res.* 1927. June. Vol. 17. Pt. 4. pp. 351–371. With 1 sketch map. [11 refs.] [Inst. Trop. Hyg., Amsterdam.]

Comparing two areas around Amsterdam only one of which is endemically malarious although *Anopheles maculipennis* is numerous in both, the authors have very thoroughly investigated the *maculipennis* population of the two areas in order to ascertain whether it exhibits any biological differences sufficient to explain the difference between them in respect of malaria.

To begin with, they looked for structural differences between the two insect populations, not for the primary importance, but for the practical convenience of such differences, and they confirmed VAN THIEL's discovery of the existence of two races of *maculipennis* (female) in Holland—a larger race and a smaller race [this *Bulletin*, Vol. 23, p. 712 and below, p. 883]. They discovered also that in the first summer brood of each the female of the smaller race attains the same size as the female of the larger race, while the latter also is abnormally large; and this discovery led them, through much interesting detail, to the conclusion that, notwithstanding this seasonal phenomenon, the difference in size between the two races is a fixed difference determined by heredity.

The points of practical importance are that the larger race predominates in the non-malarious area, and the smaller race in the malarious area; and that although both races have been found equally susceptible to infection (with *P. vivax*), each race has instincts of its own—differences of habit that are reflected in its efficiency as an agent in the upkeep of malaria. The larger race, predominant in the non-malarious area, according to the authors' observation, is disinclined for human blood in June—a month when the annual malaria epidemic is at a climax in Holland; it also has a disinclination for blood of any kind in September and October, and later on passes into a state of "complete" hibernation: all these peculiarities tell against it. The smaller race, on the other hand, is more constantly voracious, feeding on man freely in June, August, and September, and more than ever in October: again, instead of becoming torpid it passes the winter in a state of "semi-hibernation"; these peculiarities render it likely to become infected, and also to keep up an infection through winter.

The authors admit that their investigations require confirmation, even for Holland; nor do they claim that their explanation is of universal application; but their argument is interesting and in its detail very instructive, so that the paper should be read *in extenso*.

A. A.

DOORENBOS (W. B.). Zijn de muskieten, die malaria onderhouden, abnormaal levende exemplaren? [**Are the Mosquitoes transmitting Malaria Individuals living under Abnormal Conditions?**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 21–27.

In some Sumatran rubber plantations the author found *A. kochii* and *A. leucosphyrus* to be malaria infected; *A. kochii* both in the coolie-lines (5 out of 214; 2·3 per cent.) and in dry ditches in proximity to the lines (10 out of 584 or 1·7 per cent.); *A. leucosphyrus* (which was hardly ever caught in human habitations) only in the ditches (4 out of 101). The domestic *A. hyrcanus* (*sinensis*), of which 696 were caught in houses and 122 in the ditches, was not found infected. On these findings the author criticizes JAMES' views regarding *A. maculipennis*, that only individuals leading an abnormal indoor life transmit malaria. His opinion is that this appears to be true for *A. maculipennis* only because that species as a whole is markedly domestic.

N. H. Swellengrebel.

COVELL (G.). **The Distribution of Anopheline Mosquitoes in India and Ceylon.**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1927. Feb. Memoir No. 5. pp. 1–85. With 36 maps. [Numerous refs.]

This Distribution of Anopheles Mosquitoes in India and Ceylon is a princely work. Its most sumptuous feature is a uniform series of maps of India and Ceylon, of good and convenient size, and blank except for provincial boundary lines, each one of which exhibits in colour the geographical distribution of a particular species of Anopheles. The text that the maps illustrate gives for each species the critically-confirmed record of the places where that species has been observed. This less showy part of the work must have demanded an infinite amount of toil—labour of the kind that brings its physic only to the man of inflexible resolve. Apart from the maps (some of which are greatly instructive to students of zoo-geography in general) and apart from the well-constructed record, each species is introduced by statements of its synonymy, of its general geographical distribution (where required), and of its relation to malaria (where known), and by a brief description of the habitat of its larva.

A. A.

CHRISTOPHERS (S. R.), SINTON (J. A.) & COVELL (G.). **Synoptic Table for the Identification of the Anopheline Mosquitoes of India.**—*Health Bull. No. 10. Malaria Bureau No. 2.* 22 pp. With 37 figs. 1927. Calcutta: Govt. of India, Central Publication Branch.

This useful key is well lubricated with explanatory notes, definitions of topical terms, and figures of specific features.

A. A.

BOYD (Mark F.). **Studies on the Bionomics of North American Anophelines. 1. The Number of Annual Broods of** *A. quadri maculatus.*—*Amer. Jl. Hyg.* 1927. May. Vol. 7. No. 3. pp. 264–275. With 4 charts. [2 refs.]

This paper must be read *in extenso,* since its conclusions rest so much on ratiocination that cannot be condensed. From a comparative study of the charted results of routine observations at "capture-stations" carried on for a succession of years (1923–1926) the author assumes that certain sudden irregularities in the curves afford a clue to the number of generations of *Anopheles quadrimaculatus* occurring each year. His results give 8 to 10 annual generations in the latitude of south-western Georgia and 7 or 8 in that of north-eastern Carolina.

A. A.

SWELLENGREBEL (N. H.). La signification du nombre relatif des mâles dans les abris des anophèles adultes. [**Significance of the Relative Number of Males of Anopheles in Shelters.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9. Vol. 20. No. 2. pp. 121–123. [2 refs.]

Several ingenious explanations have been offered of the fact that the proportion of males to females of Anopheles found in shelters varies considerably. According to one theory the paucity of males in a shelter indicates distance from a breeding-place; according to another the males are most numerous in shelters that also provide easily procurable nourishment (of blood) for the females. From his observations around Amsterdam the author, finding breeding-places everywhere close at hand and the greatest abundance of males in shelters where (as proved by numbers of females replete with blood) blood is easily procurable, and fewer males in shelters such as barns and corn-lofts, where females are fewer and nourishment for females is less easily obtained, comes to the plain conclusion that the former kind of shelters must just be good sheltering-places for Anopheles mosquitoes. In short, the finding of a large proportion of male Anopheles in a given shelter signifies that the shelter is attractive to the Anopheles regardless of their sexual propensities.

A. A.

CHALAM (B. S.). **The Resistance of Anopheles Eggs to Desiccation.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 863–866.

Eggs of *Anopheles subpictus* and *A. stephensi* were observed by the author to hatch normally in considerable numbers—and in some cases with continuation through the normal metamorphoses to the adult stage—when returned to water after considerable terms of desiccation. For instance; of 100 eggs of *A. subpictus* 60 hatched after 6 days desiccation, and of another 100 eggs 2 hatched after 12 days desiccation. Again, of 80 eggs of *A. stephensi* 51 hatched after 6 days, and of another 100 eggs 3 hatched after 12 days desiccation. In all these instances some adults were forthcoming. The author gives details of 10 other experiments; but in no instance did any eggs hatch that had been dried for a longer term than 12 days.

A. A.

BARBER (M. A.). **The Food of Anopheline Larvae—Food Organisms in Pure Culture.**—*Public Health Rep.* 1927. June 3. Vol. 42. No. 22. pp. 1494–1510. With 1 text fig. [10 refs.]

An instructive and suggestive paper for the inexperienced. The author's summarized results are stated in the propositions that algae alone, or bacteria alone, or infusoria alone may be a sufficient source of food for Anopheles larvae ; but that, in the laboratory at least, dead organic material is far less suitable ; also that measures for suppression of larvae by destruction of their available food must take into consideration the adaptability of larvae to a variety of food.

A. A.

ADOVA, NIKITINSKY & SEBENZOW. Biologie et constitution physicochimique des tourbières et conditions qui y règlent le stationnement des larves d'anophèles. [**Biology and Character of Bogs in respect to the Presence of Anopheles Larvae.**]—*Bull. Soc. Path. Exot.* 1927. Feb. 9 & Mar. 9. Vol. 20. Nos. 2 & 3. pp. 192–196 ; 271–279. [4 refs.]

The authors admit that the term of their observations has been short, but they think that it has been long enough to justify the generalization that the bogs examined by them (in Russia) are of two kinds, namely Carex bogs, the water of which is rich and varied in life and is hospitable to Anopheles larvae ; and Sphagnum bogs in which Anopheles larvae are not to be found.

A. A.

VAN THIEL (P. H.). Sur l'origine des variations de taille de l'*Anopheles maculipennis* dans les Pays-Bas. [**Origin of Variations in Size of** *A. maculipennis* **in the Netherlands.**] — *Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 366–390. [13 refs.]

The author here returns to the subject of variation in *Anopheles maculipennis* (females) in Holland (see this *Bulletin*, Vol. 23, p. 712). He here distinguishes two varieties. One, which is larger and browner, and, having fewer maxillary teeth, is less ferocious, he assumes to be the typical *A. maculipenins* of Meigen ; the other which is smaller and blacker and (in correspondence with its more numerous maxillary teeth) is more ferocious, he now distinguishes as a new variety *atroparvus*. The larger, less ferocious kind predominates in non-malarious districts like Leiden ; the smaller, more ferocious kind predominates in malarious districts like Bolsward. As to the origin of this more dangerous variety he naturally is cautious, but he thinks the line of inquiry is indicated by the fact that its larva prefers brackish waters, and by the reasonable inference that its nutrition may have been influenced in the course of generations by this mode of life.

A. A.

STRICKLAND (C.) & CHOWDHURY (K. L.). **A New Species of Anopheline** *A. pseudojamesi* **Common in Bengal.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 240–243. With 5 text figs. [3 refs.]

Diagnoses, illustrated, of larva and adult of *Anopheles pseudojamesi*, a species which, although said to be found " all over Bengal," seems not to have been noticed before. The larva, which first attracted attention, was thought from descriptions of that species to be *pulcherrimus* ; but the first adult that issued was identified with *jamesi* though afterwards it was found to have distinctive characters of its own.

A. A.

COVELL (G.). **A New Species of Anopheles from Eastern India,** *A.* (*Myzomyia*) *Ramsayi*; **with a New Description of** *A.* (*Myzomyia*) *Jamesii* **Theobald.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 1019–1025. With 2 figs. on 1 plate. [3 refs.]

Diagnoses and descriptions with figures of wing of *Anopheles* (*Myzomyia*) *ramsayi*, a new species from Cachar and Krishnagar, and *A.* (*M.*) *jamesii* of Theobald.

A. A.

MELENEY (Henry E.). **The Types of Breeding Place used by** *Anopheles hyrcanus* **in North and Central China.**—*China Med. Jl.* 1927. Apr. Vol. 41. No. 4. pp. 347–350. [2 refs.]

According to the author *Anopheles hyrcanus* (=*sinensis*) is the chief malaria-carrier in Northern and Central China. Though occasionally its larvae are found in waters of other kinds, its usual breeding-places are ponds where the silk-weed Spirogyra forms a surface scum and the common water-weed Ceratophyllum, which grows up from the bottom, spreads its whorls just below the surface. "At Nanking, where many of the ponds are used for fish-raising, larvae were never found in ponds so used, and such ponds never contained any surface water-plants."

For controlling *A. hyrcanus*, if draining and filling ponds be impossible, the author recommends Paris green as a larvicide and, if this be impossible, cleaning out the surface plants and stocking fish.

A. A.

ROOT (Francis Metcalf). **Studies on Brazilian Mosquitoes. II.** *Chagasia fajardoi.*—*Amer. Jl. Hyg.* 1927. July. Vol. 7. No. 4. pp. 470–480. With 21 figs. on 4 plates. [13 refs.]

This is a study in full detail of *Chagasia fajardoi*, adult, larva, and pupa, in itself and in comparison with *C. bonneae*. The author considers that the differences between Chagasia and other Anophelines are striking enough to justify its separation as a distinct Anopheline genus; these differences are exhibited in the shape of the scutellum, which is distinctly trilobed with a tuft of bristles on each lobe, as in Culicini; and in the genitalia, claws, and palpi of the male, these palpi having the two terminal segments merely "somewhat swollen," not broadly flattened. The larvae and pupae of *Chagasia fajardoi* appear to be found only in streams where the current runs rapidly in narrow channels thickly fringed with tall grasses or sedges; the larvae in the laboratory are peculiar in posing close and *parallel* to the sides of the dish with the body slightly elevated at both ends, their whole behaviour being "very faintly reminiscent" of the Dixa larva.

A. A.

SEPULCRI (Piero). La valle Brian. Contributo allo studio igienico dell' ambiente palustre litoraneo. **(The Brian Valley. Contribution to Knowledge of the Marshy Littoral Environment.)**—*Riv. di Malariologia.* 1927. Jan.–Feb. Vol. 6. No. 1. pp. 72–84. With 6 text figs. (1 map.) [English summary p. 191.]

The valley of Brian, enclosed between the two mouths of the Livenza R. (Venetia), is a prolific nursery of Anopheles, although its stagnant waters are saline. This is said to be due to the fact that the fishing industry is unmindful both of the interests of agriculture and of the necessities of sanitation.

A. A.

MISSIROLI (Alberto). I tubuli del Malphigi nell' " Anopheles claviger." **(The Malphighian Tubes of the " Anopheles claviger.")**—*Riv. di Malariologia.* 1927. Jan.–Feb. Vol. 6. No. 1. pp. 1–7. With 2 text figs. & 1 plate. [4 refs.] [English summary p. 190.]

This paper deals with the histology and physiology of the Malpighian tubules of *Anopheles " claviger "* (*=maculipennis*), which the author believes to play some part in assimilation in addition to their excretory function.

A. A.

PATANÉ (Carlo). Sulla distribuzione di " *Stegomyia fasciata* " in Cirenaica. Sua frequenza ed abitudini biologiche in Bengasi nella diverse stagioni. **[The Seasonal Prevalence and Habits of** *Stegomyia fasciata* **in Bengasi.]**—*Arch. Ital. Sci. Med. Colon.* 1927. May. Vol. 8. No. 5. pp. 262–270. With 1 map. [6 refs.]

Stegomyia (*Aëdes argenteus*) is present in Cirenaica all the year round. It is troublesome about June, biting at any hour and even in the night. From June to September it constitutes 20 to 25 per cent. of all local mosquitoes ; after the middle of November its numbers diminish, and in winter it is scarce, seen only indoors, and biting only at midday.

H. Harold Scott.

ROUBAUD (E.) & COLAS-BELCOUR (J.). Action des diastases dans le déterminisme d'éclosion de l'oeuf chez le moustique de la fièvre jaune (*Stegomyia fasciata*). **[Action of Diastase on the Hatching of the Egg of** *S. fasciata.*]—*C.R. Acad. Sci.* 1927. Jan. 24. Vol. 184. No. 4. pp. 248–249. [2 refs.]

BACOT and ATKIN observed the stimulant effect of microbes and ferments upon the hatching of the eggs of *Stegomyia fasciata* ; the present authors have observed the same effect exercised by animal and vegetable digestive ferments.

A. A.

HAKKI (Ismaïl). Sur les moustiques d'Anatolie (Turquie). **[The Mosquitoes of Anatolia.]**—*Rev. Méd. et Hyg. Trop.* 1927. Jan.–Feb. Vol. 19. No. 1. p. 8.

Most of the mosquitoes of Anatolia (Asia Minor) mentioned here are common Palaearctic species with—as one would expect—some Ethiopian outliers, such as *Anopheles costalis*, and with the ubiquitous *Stegomyia fasciata*.

KANDELAKI (Simon). Zur Fauna der Stechmücken in Transkaukasien. **[Mosquito Fauna in Transcaucasus.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. June. Vol. 31. No. 6. pp. 291–297. [30 refs.]

A list, with brief commentary and specific localization, of the local mosquitoes and species of Phlebotomus.

ROOT (Francis Metcalf). **Note on the Mosquito Fauna of the Republic of Haiti.**—*Amer. Jl. Hyg.* 1927. July. Vol. 7. No. 4. pp. 463–469. With 4 figs. [2 refs.] [Sch. of Hyg. & Pub. Health, Johns Hopkins Univ.]

This list of mosquitoes from Haiti comprises 31 species and includes *Culex quinquefasciatus*, *Aëdes aegypti*, and two species of Anopheles, namely, *albimanus* and *grabhami*.

A. A.

SINTON (J. A.). **Notes on Some Indian Species of the Genus** ***Phlebotomus.*** **Part XVI. Two Assamese 'Sandflies' resembling** ***P. malabaricus.*** **Part XVII. Further Records of the Geographical Distribution. Part XVIII. Miscellaneous Notes.**—*Indian Jl. Med. Res.* 1927. April. Vol. 14. No. 4. pp. 933–939. With 10 figs. on 1 plate. [9 refs.]; pp. 941–945. [8 refs.]; pp. 947–953. With 11 figs. on 1 plate. [25 refs.]

In the first of these papers, two specimens of Phlebotomus are described from Assam which the author regards as being approximate to *P. malabaricus* and *P. zeylanicus*, if indeed they are not actually identical with the former of these species.

[The numerous and striking zoological affinities between the Eastern Himalayan (and Malayan) subregion of the Oriental Region on the one hand, and the Malabar-Ceylon subregion on the other hand—affinities that have been discussed and confirmed by several zoologists since they were first remarked by A. R. WALLACE—here find another very interesting illustration. See this *Bulletin*, Vol. 22, p. 287.].

The second paper contains records of the distribution of the several species of Phlebotomus in India and the border territories.

The third paper includes notes on *P. squamipleuris*; a record of dermal leishmaniasis in Chitral; new records of the existence of *P. argentipes* both from known foci of kala-azar and from places where that disease is not endemic; and a note on certain papillae observed on various parts of the body of Phlebotomus.

A. A.

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SINTON (J. A.). **Notes on Some Indian Species of the Genus** ***Phlebotomus.*** **Part XIX. The Value of the Female Genitalia in the Identification of Species. Part XX. The Morphology of the Buccal Cavity in Some Species. Part XXI.** *Phlebotomus christophersi* **n. sp.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 21–27. With 39 figs. on 2 plates. [8 refs.]; pp. 29–32. With 13 figs. on 1 plate. [4 refs.]; pp. 33–40. With 12 figs. on 1 plate. [3 refs.]

xix. A comparative study of some Indian species of Phlebotomus shows the existence of two types of spermatheca, one crenellated, the other smooth. Species having this organ crenellated are *argentipes, christophersi, major, papatasii,* and *simillimus* (var. *hospitii*) and all these can be differentiated by subordinate differences (here figured) in the shape of the organ, these differences being particularly striking in the case of *argentipes, major,* and *papatasii*; but this is not very clearly the case with the smooth spermatheca species. The two types of spermatheca correspond very closely with NEWSTEAD'S division of the genus into erect-haired and recumbent-haired groups.

xx. Structural detail (here described and figured) of the buccal cavity of a large number of several Indian species of Phlebotomus show specific constancy, and is concluded to be of much diagnostic value, especially in the recumbent-haired group.

xxi. Diagnosis, full description and figured detail of *P. christophersi,* a new species from Lahore.

A. A.

ASHNER (M.). **Observations on the Breeding of** ***Phlebotomus papatasii.***—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 452–454. With 1 text fig. [3 refs.]

After commenting on methods of breeding *Phlebotomus papatasii* employed by workers in other parts of the world, the author describes his own method which, in Jerusalem, gives results that are said to be quite certain and uniformly constant.

" Twenty to thirty females are brought into an earthenware pot, about 15 cm. in diameter and 5 cm. deep. The pot is covered with a piece of cloth and kept in an incubator at a temperature of 30° to 32° C. The necessary moisture inside the pot is provided by placing it in a dish of water, and the concentration regulated by increasing or decreasing the depth of the water in the dish. In case the pots are too porous we found it more convenient to place them in a dish containing damp soil, the moisture in the pots being regulated by the degree of dampness of the soil. This method saves the trouble of adding water to the pans daily, because the evaporation from the soil is slower. After five to six days most of the females will have laid their eggs and died. The pot is then opened and the number of eggs laid determined. The eggs are found both scattered and in batches on the bottom and the wall of the vessel. As a rule three or four days after opening the pot the first larvae hatch, and now food must be given immediately, because the newly hatched larvae do not live more than a day without food. It is also possible to scatter a few particles of the food mixture into the pot before putting in the females, so that there is enough food present when the larvae appear. After each examination the pot should be covered again with the cloth, to prevent the larvae escaping and other insects from laying their eggs in the food substrate.

" When the pupae start hatching the pots are opened daily in a small muslin cage, where the emerged adults are easily caught into test-tubes. Under normal conditions the hatching of the pupae will be finished in two or three weeks ; but, where the conditions are not optimal, one can still find unpupated larvae a month or so after the first adult comes out. As a rule males and females hatch at the same time and in equal numbers ; the females thus become fertilized while still in the breeding pot.

" The laboratory-bred females feed much more readily than those caught wild. They may feed two or three times during the first week without difficulty. At a temperature of 25° C., at which our flies are kept, it takes about nine days after the first blood meal for the eggs to develop and then oviposition will take place if the females are placed in the breeding pots. It is thus possible to rear several generations of *P. papatasii* in the laboratory without any difficulty."

A. A.

ADLER (S.) & THEODOR (O.). **On a Collection of Phlebotomus sp. of the Minutus Group.**—*Ann. Trop. Med. & Parasit.* 1927. Mar. 25. Vol. 21. No. 1. pp. 61–68. With 11 figs. on 1 plate & 1 text fig. [2 refs.]

The authors have dealt with the following material referable to the *Phlebotomus minutus* group : 191 males and 229 females collected in Palestine, 16 males and 112 females from Algeria, and 8 of each sex from Assam. The characters (of wing, antenna, palp, male genitalia, colour) formulated for distinguishing the separate species of this group being found insufficient, the authors searched for other and accurately distinctive specific characters. Such they think they have found in the form of the spermathecae of the female, and in the shape and armature of the pharynx and of the buccal cavity of either sex. By these characters they can not only accurately distinguish *P. minutus* from *P. africanus*, but can also separate three new species. One of these new species is represented by a single female from Palestine, another by 18 females and 4 males from Algeria, and the third by all the 16 individuals from Assam. *P. minutus* var. *niger* can be distinguished only by its colour.

[As has been well said, accuracy is the keystone of science ; but, as has been equally well said, accuracy must be followed over a very wide field of general comparative study before the keystone can be regarded as fixed.] A. A.

ROUBAUD (E.) & COLAS-BELCOUR (J.). Recherches biologiques sur les phlébotomes de la Tunisie du Nord. Méthode d'isolement cellulaire pour l'éducation sélectionnée des espèces. [**Biological Researches on Phlebotomus of N. Tunis.**]—*Arch. Inst. Pasteur de Tunis.* 1927. Apr. Vol. 16. No. 1. pp. 59–80. With 2 text figs. [16 refs.]

In northern Tunis 4 species of Phlebotomus—*P. papatasii. P. perniciosus, P. sergenti,* and *P. minutus* var. *africanus*—are to be found, the first three always in the vicinity of man and apparently having a preference for human blood, the last not having any such predilections but feeding chiefly on the blood of " small cold-blooded animals." The authors describe in detail their methods of breeding Phlebotomus for experimental purpose—methods not differing in principle from those already described by other successful operators, particularly SMITH (see this *Bulletin,* Vol. 22, p. 905–6). In describing their own observations of the larval development of *P. papatasii* they do not agree with WHITTINGHAM and ROOK that the hibernation of the fourth-stage-larva of its autumnal brood is directly due to cold (a fall of temperature below 65° F.), but regard it as a natural irregularity of growth, not peculiar to the fourth larval stage, which happens in this case to synchronize with a seasonal fall of temperature and increase of humidity [a fine distinction].

The life-cycle of *P. perniciosus* is described in detail. Its eggs, which are very much like those of *papatasii*, were deposited about 12 days after the feed of blood ; in one instance 71 eggs were laid, frequently 45 to 60 were delivered ; at a temperature of 28° C., and suitable humidity, they hatched in 6 or 7 days. The mean duration of larval life, at 28° to 30° C., was 13–19 days, of which 5 to 7 were passed in the fourth stage. The pupa stage, at 28° C., lasted 8 days. Thus the whole cycle from egg to adult might be completed (at 28° C.) in 30 days. Quite apart from the well-known influence of temperature and humidity, the authors observed a certain want of uniformity of development even in the issue of eggs of the same batch raised under the same conditions. Thus, " in a batch of eggs laid on the 18th and hatched on the 30th of September, certain individuals of both sexes completed their development after delays varying from 54 to 70 days, whilst certain tardy larvae did not issue into imagines until 106 to 110, occasionally 140, days." The authors noticed irregularities of behaviour in female adults, also of both of *P. perniciosus* and *P. papatasii* ; some of the former would take two feeds of blood before depositing their eggs, and those of the latter species were frequently observed to feed several times, at intervals of 24 hours, before producing eggs.

A. A.

WEISS (A.). Notes sur les captures de phlébotomes effectuées dans la banlieue nord de Tunis de juillet à fin octobre 1926. **[Captures of Phlebotomus in the Northern Suburbs of Tunis.]**—*Arch. Inst. Pasteur de Tunis.* 1927. Apr. Vol. 16. No. 1. pp. 84–89.

In four months (July–October) in the course of periodic visits to particular native houses in the northern suburb of Tunis the author captured 1,697 specimens of Phlebotomus, chiefly *P. perniciosus* and *P. papatasii.*

A. A.

i. PATERSON (Guillermo C.) & SHANNON (Raymond C.). Sobre una nueva especie del género *Phlebotomus* encontrada en las provincias del norte de la República. **[New Species of Phlebotomus from N. Argentine.]** —*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 298–304. With 3 text figs.

ii. ——. Sobre otra nueva especie del género *Phlebotomus* encontrado en la provincia de Jujuy.—*Ibid.* pp. 305–309. With 3 text figs.

i. Description and figures of the male of *Phlebotomus araozi,* a new species from the Jujuy and other districts in the north of the Argentine Republic where dermal leishmaniasis is endemic; its nearest affinity is with *P. migonei* of FRANCA. Among other useful revisionary matter the authors give a list of the American species of Phlebotomus.

ii. Description and figures of male and female of *Phlebotomus mazzai,* another new species from the Jujuy district. The numerous characters distinctive from *P. araozi* are tabulated.

A. A.

LEGENDRE (J.). Sur l'existence de phlébotomes à Ouagadougou (Haute-Volta). **[Existence of Phlebotomus in Upper Volta.]**—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 342–344.

The author reports the occurrence of Phlebotomus at Ouagadougou in the Upper Volta colony of French West Africa: it is very rare there, but least so in the dry season (January to May). Phlebotomus fever is not known at Ouagadougou.

A. A.

YOUNG (T. C. McCOMBIE) & CHALAM (B. S.). **Two New Sandflies from Bombay.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 849–862. With 8 figs. on 1 plate. [5 refs.]

Descriptions, differential diagnoses, and illustrative figurings of *P. chalami* and *P. colabaensis*. The latter species is based upon a single male specimen.

A. A.

NIESCHULZ (Otto). Zoölogische bijdragen tot het surraprobleem. VIII. Over Tabaniden-Broedplaatsen op Java en Sumatra. **[Tabanoid Breeding Grounds in Java and Sumatra.**—*Nederl.-Indische Bladen v. Diergeneesk.* 1927. Feb. Vol. 39. No. 1. pp. 1–41. With 12 figs. on 6 plates & 2 maps in text. [German summary pp. 41–45.]

[It is well-enough known that the larvae of Tabanidae are found—either in the water itself or in the sand or mud of the shore of pools and ponds, and sometimes in earth at a considerable distance from the water—in almost any kind of land where the adult flies can find food. The reviewer has found them in collections of seepage in the bare bouldery waste that stretches for some miles round Dungeness, where the only wild animal one sees is an occasional hare, and the only domestic animals are the few goats and fowls of the few folk who live about the distant lighthouse and signal-station]. The breeding-grounds are not always easy to hit, and the author, in Java and Sumatra, must be congratulated in having found 148 of them, from which he collected 1,909 larvae and pupae and hatched 747 adults of seven species of Tabanus (348 *T. rubidus*, 166 *T. striatus*, 104 *T. rufiventris*, and 5 all told of the other 4 species) and of 3 species of Chrysops (*C. dispar* 100, and 23 of the others). He describes the various breeding-grounds and gives a dozen fine pictures of some of them. They are situated in and about rice-fields, and in and about pools in pasture-lands, open plains, coconut plantations, woodlands, swamps, buffalo kraals, and the sea coast (salt water), and fish-ponds, also in and beside brooks in open land and woodland. And he comes to the very obvious conclusion that an attempt to get rid of Tabanus and Chrysops by destroying the homes of their larvae is not very encouraging (in de practijk vrij wel onuitvoerbaar is).

A. A.

COURTIS (Baudilio). Miasis de saco lagrimal. [**Myiasis of the Lachrymal Sac.**]—*Semana Méd.* 1927. May 26. Vol. 34. No. 21 (1741). pp. 1307–1309. With 2 text figs. [35 refs.]

The patient, a man of 70, during the last year had noticed a swelling the size of a small shot in the region of the left lachrymal sac. A month prior to coming for treatment it was the size of a chick-pea and was accompanied by intense itching and the passage of viscid fluid from the duct-opening. Six days later when seen by the author, there was much painful swelling and oedema of the surrounding parts. Yellowish-white pus was evacuated and three living larvae, which, after removal, pupated and finally proved to be *Calliphora vomitoria*.

H. Harold Scott.

BEZZI (Mario). **Some Calliphoridae (Dipt.) from the South Pacific Islands and Australia.**—*Bull. Entom. Res.* 1927. Mar. Vol. 17. Pt. 3. pp. 231–247. [6 refs.]

This is a purely taxonomic paper. Having recently studied a large collection of Muscid flies from the Fiji Islands, and a number of species from Samoa and other South Pacific Islands as well as material from New Zealand and E. Australia, the author has made a revision of the Calliphoridae and describes here some new species.

A. A.

FAGGIOLI (R.). " Eristalis tenax," parásito accidental del cuerpo humano. [*Eristalis tenax*, **an Accidental Parasite of Man.**]—*Semana Méd.* 1927. Apr. 7. Vol. 34. No. 14 (1734). p. 887.

Case of a child of 15 months with a history of intestinal disturbance, abnormal appetite, and discharge of worms (hilitos, gusanos), who was observed to pass larvae of *Eristalis tenax* (" rat-tailed larvae "). Treatment consisted of calomel and santonin.

A. A.

FERGUSON (Eustace W.). **Tabanidae of the Samoan Islands.**—*Bull. Entom. Res.* 1927. Mar. Vol. 17. Pt. 3. pp. 315–316. With 1 text fig.

*Tabanus samoensis* is here recorded as the first representative of the Tabanidae brought from the Samoan Is., and is described as a new species.

A. A.

LLOYD (Ll.), JOHNSON (W. B.) & RAWSON (P. H.). **Experiments in the Control of Tsetse-Fly. (Report of the Tsetse Investigators in N. Nigeria.)**—*Bull. Entom. Res.* 1927. June. Vol. 17. Pt. 4. pp. 423–455. With 1 map, 13 charts & 4 figs. on 2 plates. [6 refs.]

This report is a continuation from January, 1924 to May 1926. It deals with *Glossina morsitans* and *tachinoides*. A considerable part of it is devoted to description of routine observation of the bionomy and the trypanosome infections of these two species.

An experiment of excluding game from half a square-mile of country where *morsitans* had been studied for a year and *tachinoides* for two years is described. The enclosure included a long, narrow, shallow pond surrounded by thicket. Beyond it on two sides was a wide plain almost shadeless in the dry season, on another side a patch of heavy forest, and on the fourth side a river with an intervening half-mile of drying swamp. The enclosed thicket gave cover to various antelope and the warthog, besides monkeys and porcupine and various small carnivora, and was visited by larger Ungulates, lion and hyaena. Bird life was very varied and wonderfully abundant, and Monitor lizards and large snakes (and possibly the crocodile) were there. The fencing, three inches of which was buried, consisted of 5½-foot, 4-inch mesh, 14-gauge wire-netting, double in half its height, and was fixed to wooden posts at five-foot intervals. The total cost, including labour of construction (average of 80 day-labourers for ten weeks) came to £700. After the enclosed area had been cleared of game larger Ungulates continued to haunt the outskirt (which—as well as the periphery of the enclosure—was kept clear of grass for a width of 15 feet), but in the second dry season " the fence had a deterrent influence over a considerable area " outside it. Occasional attempts to break or leap the wire were made, and a duiker may perhaps have slipped through, but on the whole the fencing answered its purpose. The result of exclusion of game is thus summarized.

. The removal of game " set up a state of starvation in *morsitans* and to some extent in *tachinoides*. There was a marked reduction in the abundance of both species, especially in *morsitans*. More blood than usual was taken by *morsitans* from birds, and both species contained a larger proportion of blood of human type than is usual. Invasion of the enclosed area by tsetse from outside vitiated the experiment and resulted in certain anomalies, *viz.*, that the rate of trypanosome infection remained high ; the blood content was not appreciably decreased ; the proportion of very young flies increased abnormally in *morsitans*. It is considered that game destruction, if it could be accomplished, would lead to a disappearance of *morsitans*, but not of *tachinoides*, and for this reason no policy of game destruction is recommended, but a policy of *laissez faire* towards the game in Northern Nigeria, so that there may be no increase in the wild Ungulata, which results in increase and spread of fly."

The authors, however, do not claim that their experiment has been satisfactory, although it has yielded a good deal of information. They object that the experiment has been carried out in a " secondary focus " of tsetse-fly—[a " secondary focus " being comparable with a favourite spa with its naturally fluctuating population of tourists and temporary residents]. They insist that the experiment could be convincing only if it were carried out in a " primary focus " where there is always a resident population regularly increasing to and beyond the limit of available sustenance.

Details are given of an experiment in deferred grass-burning. The sweeping fire caused a great mortality of *morsitans* and *tachinoides*, both adults and pupae. Although hardly affecting the established thicket it probably checked expansion of thicket. It is thought that late-firing, well organized, would be an effective check, though very difficult to arrange in Northern Nigeria.

A preliminary account is given of the beginning of an experiment in clearing with subsequent settlement, only the main route through the area and the thicket fringing the pools being cut down.

An account is given of an unsuccessful attempt to introduce the Chalcidid parasite *Syntomosphyrum glossinae*. [The experiment was of a cruder kind than the one in Nyasaland described by LAMBORN (*Bulletin*, Vol. 22, p. 291 and above), the results of which LAMBORN, too, now considers to be not vastly promising].

A. A.

HARRIS (R. H.). **Tsetse Fly in Zululand. Control Methods tried by Felling Trees.**—*Farming in S. Africa*. Pretoria. 1926. May. Vol. 1. No. 2. pp. 58–60. With 9 text figs.

From of old it seems to be well known in Zululand that tsetse-flies avoid large open expanses of grass that are clear of tree and bush. The object of the experiment here described was to discover what width of such open space will stop the flies. In the midst of a patch of fly-haunted bush a circus track having a breadth of fifty yards was cleared, the core of bush within the ring being 4 or 5 acres in extent ; the felled trees were piled at the outer edge of the ring to stop the entrance of animals from the bush beyond. During sixteen months the cleared ring was regularly crossed by fly from beyond. By two or three subsequent operations the breadth of the cleared circus was increased outwards to 300 yards, the felled trees being left lying ; but instead of a decrease there has been an increase in the incoming of fly due, it is thought, to the attractions of the labourers. The effect of removing the felled trunks and making a perfectly clean zone 400 yards broad between the observation core and the bush beyond is to be observed next.

A. A.

TANGANYIKA TERRITORY. **Summary of Tsetse Work done in Tanganyika Territory.** [SWYNNERTON (C. F. M.), Director, Game Preservation Dept.] Mombasa: 1927. Jan. 15. 12 pp. F'cap. [Received from the Colonial Office July 26, 1927.]

This type-script report contains a full and lively account of all that has been and is being done, and we may select for notice, as being matter of general interest, that part of it which describes the successful operations for tsetse-fly control in the Shinyanga sultanate, where work on a large scale was started in 1924. Here 54 square miles have been cleared, so far, the method adopted being thicket-clearing and late-burning ; [but whether this is the basis of the "successful and economical method of destroying bush permanently," separately mentioned, is not evident]. Twenty square miles are stated to have thus been actually freed of fly (*G. swynnertoni*) ; while by fires alone over another area of about 200 square miles the numbers of fly have been reduced—as estimated by average daily catches—to less than 2 per cent. of the 1924 numbers. Natural birdlime, on dummies and vehicles and men, has been found fairly useful as an auxiliary. A thousand settlers and 40,000 head of cattle have been brought into the cleared tracts, and a thousand goats have been distributed among the settlers to test their usefulness [well—and often too well—demonstrated in other parts of the world] in keeping down scrub. On the other side of the account, the Tabora-Mwanza Railway is said to be carrying fly into clean country as well as into the cleared areas in Shinyanga.

Thousands of workmen are employed in these operations of reclaiming the country from fly, and even the voluntary workers must be supplied with meat.

The chief needs for carrying the work to a successful issue are—besides men and money—motor transport, and legislation for the control of grass fires.

A. A.

SCHWETZ. La limite actuelle de la *Gl. morsitans* autour d'Elisabethville (Katanga) avec quelques considérations sur les causes du recul progressif de cette mouche. [**The Present Limits of** *G. morsitans* **around Elizabethville. The Causes of its Progressive Retirement.**—*Bull. Soc. Path. Exot.* 1927. Jan. 12. Vol. 20. No. 1. pp. 78–87. With 1 map in text. [1 ref.]

After ample and attentive observation the author endorses RODHAIN'S statement that *Glossina morsitans*, which undoubtedly was on the spot when Elizabethville was established in 1910, no longer now exists in the neighbourhood of that town. Along the frequented route to the north-east it is hardly to be discovered within 90 km.; along the route to the south-west he has had to search for 25 to 30 km. before finding it; while to the south he has not been able to procure a single specimen (for reward offered) within 125 km. In accounting for this disappearance he attributes it chiefly to the disturbance and destruction of game. He admits that there may be some other contributory circumstances, still to be discovered; but he insists that alone of all the tsetse-flies *G. morsitans* is so strictly necessitated to game that it cannot survive its extinction even in an area where man and his domestic animals have already become settled.

A. A.

ARCHIBALD (R. G.). **The Tsetse Fly-Belt Area in the Nuba Mountains Province of the Sudan.**—*Ann. Trop. Med. & Parasit.* 1927. Mar. 25. Vol. 21. No. 1. pp. 39–44. With 3 figs. on 1 plate & 1 map.

As far as can be ascertained from dry-season observations this fly-belt is limited to the Koalib Hills (running north and south between lat. 11°·31′ to 11°·52′ N. and long. 30°·31′ to 30°·30′ E.), and to certain localities (well-known to the natives of the hills) adjacent to the grazing-grounds there. The local fly is *Glossina morsitans*, which appears to be dependent mainly on the small native cattle, these being said to be immune to trypanosomiasis; wild game is absent, and man is said to be not molested. Blood from horses in the district has been found infected with *Trypanosoma pecaudi* and *congolense*. No case of human trypanosomiasis has been recorded locally, but facilities for obtaining information have been few.

A. A.

IOFF (I.) & EFREMOW (V. N.). Zur Frage ueber Fauna und Biologie der Flöhe an Haustieren in Mittelasien. [**Fleas on Domestic Animals in Central Asia.**]—*Pensée Méd. d'Usbekistane.* Taschkent. 1927. No. 3–4. German summary pp. 234–235. [In Russian pp. 167–174.

The common fleas of domestic animals in Central Asia are said to be *Ctenocephalus canis* and *felis*, *Pulex irritans* (8 per cent.), and *Echidnophaga gallinacea*—the last being also a common parasite of various wild animals. Fleas swarm suddenly in May and June, decrease in numbers in summer, increase again for a short time in September, their numbers in winter being variable, except in the case of *E. gallinacea*, which in winter almost forsakes domestic animals.

A. A.

WAGNER (J. A.). Sur les aphaniptères rassemblées en 1913 par les compagnies épidémiologiques au Sud-Est de Russie. [**Fleas collected in 1913 in South-East Russia.**]—*Arch. Sci. Biol.* 1926. Vol. 26. No. 1–3. French summary pp. 201–202. [In Russian pp. 103–113.]

This appears to be another version of a paper already noticed in this *Bulletin* (Vol. 23, p. 873), with the addition of a key for identification of the fleas described.

A. A.

INGRAM (A.). **New Fleas from South African Rodents.**—*Bull. Entom. Res.* 1927. Mar. Vol. 17. Pt. 3. pp. 289–293. With 4 text figs.

Descriptions of 2 species of fleas from Karroo rats and 1 species from the golden rock-mouse.

A. A.

MAZZA (Salvador) & FRIAS (Dardo). Nota sobre accidente producido por larvas de *Hyperchiria coroesus* (rupa chico). [**Symptoms produced by Larvae of** *H. coroesus.*]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 531–533. With 1 text fig. [4 refs.]

The author mentions some of the urticating lepidopterous larvae of the Argentine and describes and figures the big bristly-plumed caterpillar of *Hyperchiria coroesus*. This remarkable creature, which attains a length of 6 cm., is of a verdant green colour and carries erect on its back rows of long, stout bristling feathers. In the vernacular it is known as *rupa chico*, and usually it is found on shrubs called *guaranguay* (two species of *Stenolobium*). It is common in the northern districts of the Argentine, and the barbs of its feathery bristles cause a dolorous inflammatory urticaria.

A. A.

MYERS (J. G.). **The Habits of** *Alysia manducator* **(Hym., Braconidae).**—*Bull. Entom. Res.* 1927. Mar. Vol. 17. Pt. 3. pp. 219–229. [3 refs.]

*Alysia manducator* is a parasitic Hymenopteron of the Braconid family. The female lays usually a single egg in a well-grown Muscid maggot. Little development occurs until the Muscid maggot pupates, but then the Alysia larva consumes the Muscid pupa and finally spins its own cocoon and undergoes its own metamorphosis in the empty Muscid puparium, the adult Alysia emerging a few weeks later in summer, but not until the following year in the case of eggs deposited in their host-maggot in autumn. The Alysia does not restrict its range to any particular host species, although it has strong preferences, among which are species of Lucilia and Calliphora. The observations on Alysia here recorded are merely supplementary to the classical studies of GRAHAM-SMITH (*Parasitology*, Vol. VIII, 1916 and Vol. XI, 1919).

A. A.

DE CASTRO (A. Bayley). **The Effects of Bee Venom.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 252–253.

Does not contain anything original about bee-venom, although there are some interesting cases illustrating the well-known facts that an angry bee does not always sting nor always inject all the venom in its poison-bag, and that a swarm of angry bees which will certainly attack a man who flees or tries to drive them off may take no notice of a man who remains perfectly still and self-collected.

A. A.

PAVLOVSKY (E. N.) & STEIN (A. K.). Experimentelle Untersuchung ueber die Giftwirkung von *Paederus fuscipes* Curt. (Coleoptera, Staphylinidae) auf den Menschen. [**Study of the Poisonous Action of** *P. fuscipes.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. June. Vol. 31. No. 6. pp. 271–282. With 4 text figs. [9 refs.]

—— & ——. **The Cutaneous Poison of the Beetle,** *Paederus fuscipes.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Mar. 9. Vol. 20. No. 7. pp. 450–451.

Staphylinid beetles of the genus *Paederus* have an almost world-wide notoriety by reason of the rather violent dermatitis that they can cause in man. This paper contains an elaborate account of the toxic properties of *P. fuscipes* and of their pathological effects upon the human skin. The toxin occurs in the insect's blood and, in a less degree, in its reproductive organs, male and female ; the noxious effects occur only when the human skin is broken—as is likely to happen when the insect is crushed upon the skin.

A. A.

BOGEN (Emil) & BERMAN (Phoebus). **Poisonous Spider Bites, with Especial Reference to the** *Latrodectus mactans.* **A Clinical and Historical Study of a Widespread but Little Known Condition.**—*California & Western Med.* 1927. Mar. Vol. 26. No. 3. pp. 339–341.

*Lathrodectes mactans* is a spider of a genus that is represented in warm countries all round the globe. This particular species is common in certain parts of America, being variously known locally as the "black-widow," "shoe-button," and "hourglass" spider, and is notorious for the painfully serious effects of its bite. The authors give here brief summaries of 15 cases of this spider-bite that have been treated at the Los Angeles Hospital during recent years—8 of them during the last year.

Most of the cases are of men bitten when using outdoor privies, who saw and described the spider ; and since there still lingers a tendency to under-rate the virulence of Lathrodectes-venom the authors' generalized version of its effects, based on their own actual observations of hospital cases, is given verbatim.

" In no instance was there any marked swelling or inflammation present at the site of the bite. Severe pain, arising soon after the bite and increasing in intensity for an hour or two, was a constant complaint. It started generally in the neighbourhood of the bite, but soon spread, and was localized in the abdomen and legs in nearly all of the patients, but was also felt in the chest, arms, genitals, groins, back, and " all over " in many. The pain, which was described as intense, excruciating, agonizing, severe, throbbing, cramping or aching, and was evidenced by writhing, tossing, doubling up and moaning, persisted for from four to eight hours undiminished and then gradually subsided during the course of the next 24 hours, but complete relief was not experienced for a number of days, and often not for a week.

" Profuse perspiration, restlessness, nausea and vomiting, constipation, and dyspnoea were prominent symptoms, but vertigo, ataxia, chills, urinary retention, localized edema, and persistent hiccough were also noted. The abdomen was extremely rigid, but tenderness was usually absent, the reflexes were hyperactive, and priapism was noted in one instance.

" A mild fever, generally around 100 and in no case going above 101·6, was usually found, but the daily fluctuation in temperature was increased, and many of the patients showed a subnormal temperature at some time. The pulse was generally slow as compared with the temperature, being below 66 in more than half of the patients at some time, and the respiration, although occasionally accelerated for short periods at first, soon approximated a normal rate. The blood pressure was elevated in every instance, averaging 150 mm. mercury systolic with 87 diastolic on admission, but dropped rapidly on later readings. Leukocytosis was present on admission, averaging 14,800 in the cases examined on the first day in the hospital, the highest count being 21,800, but by the third day the average white blood count was only 10,700, the lowest being 5,900. There was generally a relative increase in the polymorphonuclear leukocytes on the date of admission. The red blood count was variable, being above normal in several instances, and the color index was about one. Four of these patients had a positive Wassermann reaction. A trace of albumin and a few hyaline or granular casts were found in the urine in six cases, and blood was reported once."

" The treatment at the Los Angeles General Hospital consisted of: (1) Sedation, with morphin, codein, bromides, chloral, veronal and hot applications ; (2) stimulation, with spirits of ammonia, caffein and strychnin ; and (3) elimination, with magnesium citrate or Epsom salts, castor oil, calomel, enemas, catheterization, and gastric lavage. Although we have not yet had a fatality, the large doses of narcotics required to give adequate relief made it desirable to seek some more efficient form of treatment. Convalescent serum was given intramuscularly in the last four severe cases. The results, while not absolutely conclusive, are sufficiently encouraging to warrant the continuation of the use of this treatment, and accordingly a supply of convalescent serum is now kept at the hospital in readiness for this purpose."

A. A.

KOROWNIKOW (A. F.). [Contribution à l'étude de la symptomatologie de la piqûre du Lathrodectus (" Kara-Kourte ").] [**Symptoms of the Bite of Lathrodectes.**]—*Pensée Méd. d' Usbekistane.* Taschkent. 1926. Vol. 1. No. 1. pp. 12–16. With 2 text figs. [In Russian.]

An account from Turkestan of a case of spider-bite from *Lathrodectes tredecimguttatus*, known in Russia as " Kara-Kourte." The bite had the appearance of a pin-prick. The subject, examined after two hours, was breathing with difficulty and complained of generalized pains and headache. There was numbness of and inability to move the extremities. The face and body were in a cold sweat, but the extremities were cold and dry. The abdomen was swollen, the patient complaining of a feeling of heaviness and suffering from frequent eructations. The pulse was 100 and irregular. During the day the pulse improved, but the other symptoms were still present, the condition of the patient gradually improving during the second day. On the third day the patient was able to walk about, a general weakness being the only symptom left. In addition to camphor, sodium benzoate, and sodium sulphate the patient received some heroic treatment by native methods : the offensive spider was ground with oil and the mixture applied to the puncture ; and towards the evening of the first day the patient was placed on the floor face downwards while three natives trampled on his back.

The author notes that the venom of Lathrodectes evokes no local symptoms, but apparently produces a rapid general intoxication. In Turkestan the " Kara-Kourte " is usually encountered in arid " wormwood " (*Artemisia*) deserts, and is introduced into human dwellings with the (wormwood) fuel.

C. A. Hoare.

JACKSON (E. S.). **The Red-Backed Spider Bite.** [Correspondence.]—*Med. Jl. Australia.* 1927. Apr. 2. 14th Year. Vol. 1. No. 14. pp. 524-525.

Accounts of spider-bite in the daily Press have moved the author to record his own experience of a fatal case that occurred in Queensland about forty years ago. The victim was a boy of 3 or 4 years ; he was bitten in the groin, and a " red-backed spider " [probably a Lathrodectes] was found in his clothing. The marks of the poison-claws were visible when the child was brought to the Brisbane Hospital, " dull and heavy," 18 hours afterwards. " Death ensued within 36 hours at most after admission," and at the necropsy the whole chain of lumbar glands was found to be enlarged and engorged—the only abnormality discovered.

A. A.

McKAY (Stewart). **The Red-Backed Spider Bite.** [Correspondence.]—*Med. Jl. Australia.* 1927. Apr. 23. 14th Year. Vol. 1. No. 17. pp. 626-627.

This is a discursive review of the subject of animal toxins with particular reference to the venom of the species of Lathrodectes popularly known in Australia as the red-backed spider. The author makes the not unreasonable suggestion that the bite of this spider should be treated on the same principles as snake-bite.

A. A.

DUNN (Lawrence H.). **Notes on Two Species of South American Ticks, *Ornithodoros talaje* Guerin-Mene., and *Ornithodoros venezuelensis* Brumpt.**—*Jl. Parasit.* 1927. Mar. Vol. 13. No. 3. pp. 177-182. [5 refs.]

The careful observations of this author lead him to the conclusion that of the two species of Ornithodorus, *venezuelensis* and *talaje*, prevalent in various northern parts of South America, *venezuelensis*, which is found in considerable numbers in many human habitations attacking the occupants, is the principal transmitter of relapsing fever in tropical America. *O. talaje* has been shown by experiment to be capable of transmitting the disease, but since it is commonly found on rats in its larval stage, it is assumed that its nymphs and adults feed on rodents and other animals and only attack man in extreme necessity.

A. A.

SCHWETZ (J.). Note sur les Ixodidae (tiques) du Katanga. [**Ticks of the Katanga.**]—*Rev. Zool. Africaine.* 1927. Apr. 1. Vol. 15. No. 1. pp. 65–72.

——. Contribution à l'étude des Ixodidae (tiques) du Congo belge. (D'après les collections du Musée Royal d'Histoire naturelle de Bruxelles. (Deuxième note). [**Ticks of Belgian Congo.**]—*Ibid.* pp. 73–80.

——. Contribution des Ixodidae (tiques) du Congo Belge. (D'après la collection du Musée du Congo belge de Tervueren-Bruxelles.) (Troisième note.)—*Ibid.* pp. 81–92.

The most noteworthy point in these lists of ticks is the inclusion of *Argas persicus*, which species has now been discovered in Elizabethville and other places in Katanga.

A. A.

VOGEL (R.). Einige Beobachtungen ueber Zecken Kleinasiens. [**Observations on Ticks of Asia Minor.**]—*Cent. f. Bakt* I Abt. Orig. 1927. July 1. Vol. 103. No. 1–3. pp. 119–123. [8 refs.]

Pleasing, unsophisticated, summer holiday observations and comments on ticks in Anatolia, the species noticed being *Ornithodorus lahorensis* (which the author thinks may be identical with *canestrinii*), *Hyalomma syriacum*, *H. aegyptium* and *H. pusillum* and its subspecies *alexandrinum*, *Rhipicephalus sanguineus* and *Haemaphysalis otophila.*

A. A.

HIRST (Stanley). **The Principal Species of Acari Parasitic on Rats, with Brief Notes on Hosts and Distribution.**—*Jl. Ceylon Sci.* (Sect. D. Med. Sci.) 1926. Dec. 18. Vol. 1. Pt. 4. pp. 273–276. With 7 plates. [6 refs.]

Along with a list of 7 species of mites of the Gamasid family that occur on rats the author gives a key for distinguishing the 7 blood-sucking genera of that family which have been found on those rodents. He regards the species of Dermanyssus and Liponyssus as those most likely to be dangerous to man, since Liponyssus from the rat has been observed on man in several distant parts of the globe, and the common Dermanyssus of poultry frequently bites human beings.

A. A.

HORA (Sunder Lal). **The Use of Fishes for the Control of Mosquitoes.**—*Indian Med. Gaz.* 1927. Apr. Vol. 62. No. 4. pp. 187-188.

This is a discursive article. The author draws attention to the insufficient use of fish for anti-mosquito work in India and also to the absence—except only in Madras—of any machinery for supplying larvicidal fishes were they in request. He emphasizes the necessity of clearing ponds and "tanks," into which larvicidal fishes are to be introduced, not only of vegetation but also of any existing carnivorous fishes ; and he takes this opportunity of criticizing the well-intentioned efforts of certain benevolent officials in India who are propagating the predaceous and exceedingly tenacious *murrel* (Ophiocephalus) in the tanks within their jurisdiction. This criticism gives point to his argument that the study of bionomy should precede the confident advances of the "practical" man, and gives license to his offer, made in behalf of the Zoological Survey Department of India, of preliminary co-operation in these and other kindred matters.

A. A.

LETSCHENKO. Sur la déglutition des sangsues en Asie Centrale, son diagnostic et ses moyens d'extraction. [**Deglutition of Leeches in Central Asia.**]—*Pensée Méd. d'Usbekistane.* Taschkent. 1927. Vol. 1. No. 3–4. French summary p. 232. [In Russian pp. 124–129. 10 refs.]

In Central Asia leeches often happen to be imbibed in drinking water and to attach themselves to the wall of pharynx and gullet, remaining attached sometimes for weeks or even months, and then causing grave anaemia. They may even happen to be swallowed, but are soon killed in the stomach. A strong solution of common salt loosens a leech from its hold, and it can then be removed by forceps.

A. A.

BISWAS (L. M.) ; STRICKLAND (C.). **A Strange Parasite of Man. With a Note on the Polychaete in the Human Nasopharynx.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 256–257. With 1 text fig.

This so-called parasite of man is a living individual marine polychaete worm of the genus Nereis—a mature active individual about an inch long—that was discharged in muco-pus and with much coughing and sneezing from the nose of a patient in the course of an acute and painful attack of a coryza due to, or aggravated by, the presence of the worm. The patient was a Hindu blacksmith of Calcutta who was accustomed to bathe in the Ganges (Hugli). Although Nereids are typical marine worms, some of them, like a great diversity of other marine animals, have considerable powers of adaptation to the sundry tidal and seasonal variations of delta waters such as the Hugli at Calcutta ; so that there is nothing very strange in the appearance of a Nereis in that river. What is remarkable is that the creature should have found its way unnoticed into a man's nasopharynx, and, having done so, could have lived there for a week or more. Strickland contributes a learned discussion of this phenomenon ; [and the question will probably—like the *Pachydrilus lineatus* question (see this *Bulletin*, p. 439, *ante*)—give rise to further discussion on the exuberant subject of "parasitism."].

A. A.

SESHACHALAM (T.). **An Unusual Foreign Body in the Ear.**—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. p. 145.

The unusual body in this case was a young scorpion, an inch long, and "found to be alive."

A. A.

ROXBURGH (A. C.). **The Treatment of Insect Bites and Stings.**—*Lancet.* 1927. May 28. 1146–1147.

Does not contain anything novel either in principle or practice.

A. A.

SHERWOOD (J. W.). **Insect Pests in Texas.**—*Milit. Surgeon.* 1927. May. Vol. 60. No. 5. pp. 581–587.

A useful list of " the indigenous disease-transmitting ' insects ' [Arthropoda] or potentially disease-transmitting ' insects ' [Arthropoda], and of those ' insects ' [Arthropoda] which, because of prevalence in large numbers throughout most of the year, constitute a pest " in Texas.

A. A.

DO AMARAL (Afranio). **The Snake-Bite Problem in the United States and in Central America.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 229–237. With 8 text figs.

The author estimates that about 1,000 cases of venomous-snakebite occur annually in the U.S.A., the mortality ranging from about 10 per cent. in the north to about 25 per cent. in the south-west (where also the number of cases is greatest). He believes that the conversion of jungle into arable land " aggravates the dangers of ophidism," since corn means increase of the rodents on which vipers feed and multiply and also increase of human beings to get bitten by serpents. Fortunately, an Antivenin Institute of America has been started by the joint endeavour of certain private individuals and scientific societies and with the participation of the United Fruit Company.

A. A.

COX (Wesley C.). **First Aid Treatment in Cases of Poisoning due to Rattle Snake Bite.**—*Milit. Surgeon.* 1927. July. Vol. 61. No. 1. pp. 53–55.

The treatment here described in great detail consists after application of the tourniquet, of free crucial incision not only at the site of the bite but also in the area round about, followed immediately by suction (by mouth, if apparatus be not available). Suction is to be prolonged for about half an hour, and is to be repeated at least once and if necessary at intervals while incisions are draining or any swelling exists. After the second suction a dressing of hot saturated solution of magnesium sulphate is applied to cover all incisions. " The patient is watched to determine if constitutional symptoms develop. In such a circumstance serum is indicated."

This treatment is stated to have proved efficacious both by experiment on animals and in cases of rattlesnake bite ; but the experiments and the cases treated are not described or further mentioned.

A. A.

WADA (Heimu). **Experimental Studies on Treatment of Bites of Snakes.** (*Agkistrodon blomhoffi* **Boie.**)—*Japan Med. World.* 1927. Feb. 15. Vol. 7. No. 2. pp. 35–41.

The poisonous snakes of Japan are species of Lachesis and Ancistrodon, and the author deals with the latter.

The bite of Ancistrodon causes pain and local swelling and extravasation, which may be followed by local necrosis ; it is very rarely fatal.

Being satisfied that for all practical purposes local treatment is sufficient, the author proceeded to test the effects of $KMnO_4$ and $H_2O_2$ on rabbits, for which animals the M.L.D. of Ancistrodon venom he found to be 4 mgm. [The paper is not of great intrinsic value since the author appears to ignore all previous experimental work on the action of $KMnO_4$ upon snake-venom.]

A. A.

i. WATKINS (Arthur). **Treatment of Snake Bite.** [Correspondence.]—*Med. Jl. Australia.* 1927. Apr. 30. 14th Year. Vol. 1. No. 18. p. 665.

ii. MACINNES (A.). **Treatment of Snake Bite.** [Correspondence.]—*Ibid.* May 21. 14th Year. Vol. 1. No. 21. p. 771.

i. Describes the treatment adopted in the case of an Australian aborigine bitten by a tiger-snake [*Notechis scutatus*] and brought-in, collapsed, two hours after the accident. A loose ligature had been applied, and dry $KMnO_4$ some time in the interval. The author reinforced this local treatment and then administered 2 oz. of the aromatic spirit and 20 grains of the plain carbonate of ammonia, by mouth and per rectum respectively, followed in 5 minutes by another oz. of the aromatic spirit. This treatment having been speedily effective the author recommends it, without qualification, for general edification.

ii. This is a rather sharp criticism of the above paper. This author makes the legitimate inference that the patient was suffering from shock, but also makes the unnecessary assumption that the cause was not a snake-bite. He condemns the use of $KMnO_4$ as a " fetish " and recommends as the ideal treatment for the bite of a venomous snake—aside from the continued administration of cardiac and respiratory stimulants—to apply a tourniquet above the wound and then at regular intervals (20 minutes or so) to loosen the tourniquet for a moment in order to allow a small dose of the inoculated venom to enter the circulation and thus in time to produce immunity. " In any part of the body not fitted for the use of a tourniquet the only rational treatment is immediate excision of the tissue containing the venom, at the same time expressing a pious hope that no venom has been left behind."

[Neither of these authors refers to antivenomous sera or to the impressive experimental work done in many parts of the world, including Australia, on snake-venom and the rational treatment of snake-bite. The papers, however, are instructive as illustrating the fallacies imbedded in the assumption that " snake-bite," even in its application to a specific venomous snake, is a precise term with definite implications].

A. A.

SUZUKI (Yasuju). **Studies on the Antidotal Action of the Ash of Oyster's Shell for the Viper's Poison.**—*Sei-I-Kwai Med. Jl.* 1927. Apr. Vol. 46. No. 4. English summary pp. 39–40. [In Japanese.]

Since the ash of oyster-shell has been supposed to be a remedy for viper-bite the author has investigated its properties. He finds that it adsorbs viper-venom *in vitro,* its power of adsorption being four-times that of Kaolin and being dependent upon its calcium hydroxide and oxide constituents.

A. A.

BELFANTI (Serafino). I veleni degli animali nella biologia. [**Animal Venoms and their Biology.**]—*Biochem. e Terap. Sperim.* 1927. Jan. 31. Vol. 14. No. 1. pp. 1–21. [26 refs.]

This article, though occupied largely with the remarks on the work of others, brings forward some interesting points which might well be followed up. Snake-venoms are chiefly dealt with. The author is of opinion that all snake-venoms are haemolytic if the three factors—red cells, lecithin, and poison—are all present ; if the second is absent or deficient there will be no haemolysis. Thus, cobra venom will haemolyse the corpuscles of man, dog, horse, rabbit, guineapig, but not those of the ox, sheep or goat. He states that one-twentieth or even a thirtieth of the dose of Naia venom lethal to certain fish will prove fatal if lecithin is added, as a small quantity of yolk of egg.

H. Harold Scott.

KAGAIA (Y.). Ueber die präzipitierende Wirkung des Schlangengiftes, insbesondere des Kobragiftes. [**The Precipitating Action of Snake Venom, especially Cobra Venom.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Feb. 14. Vol. 50. No. 1-2. pp. 1–30. [16 refs.]

The present studies on snake venoms—particularly cobra venom—are wholly serological and deal with their precipitation reactions (with sera and aqueous extracts of various species of animals) under varied experimental conditions of concentration, temperature, chemical association, etc., and with the relations between toxicity and precipitation property and between precipitation and complement destruction.

A. A.

KATAHIRA (S.). Ueber die Veränderung des Blutbildes von Kaninchen nach Injektion der Gifte der wichtigsten Giftschlangen von Formosa. [**Change of Rabbit's Blood Picture after Injection of Snake Venoms of Formosa.**]—*Taiwan Igakkai Zasshi.* (*Jl. Med. Assoc. Formosa*). 1927. May. No. 266. German summary pp. 1–2. [In Japanese.] [Govt. Research Inst., Formosa.]

The various effects upon the corpuscular elements of the blood (of the rabbit) that follow injections of venom of, severally, *Lachesis gramineus, L. mucrosquamatus, Ancistrodon acutus,* Naja, and Bungarus, are here described in detail, but they cannot be condensed or generalized.

A. A.

ROSSIGNOLI (J. J.). Modifications physiques et chimiques du plasma sous l'action des venins de serpents *in vivo.* [**Changes in Plasma under Action of Snake Venoms** *in vivo.*]—*C.R. Soc. Biol.* 1927. July 8. Vol. 97. No. 22. pp. 414–415. [Physiol. Inst., Faculty of Med., Buenos Aires.]

A record of physico-chemical modifications of the plasma (of the dog) that follow injections *in vivo* of venom, severally of *Lachesis alternatus, L. neuwiedii,* and *Naja tripudians.* There follows a similar record of modifications, *in vitro,* of horse-serum caused severally by these venoms and those also of *L. ammodytoides* and *flavoviridis,* and *Vipera russellii.* Details not amenable to abstraction.

A. A.

ASHWORTH (J. H.). The Distribution of Anopheline Mosquitoes in Scotland.—*Proc. Roy. Soc. Edinburgh.* 1926–1927. Vol. 47. Pt. 1 (No. 6). pp. 81–93. With 1 map. [15 refs.]

CHATTERJEE (G. C.). A Note on the Method of Multiplication of Trichomonad Flagellates of Different Species in Artificial Culture.—*Jl. Dept. Sci.* Calcutta. Vol. 8. pp. 15–20. With 2 plates.

FIELDING (J. W.). Australasian Ticks.—*Commonwealth of Australia. Dept. of Health. Service Publication (Tropical Division) No. 9.* 114 pp. With 36 figs. & 1 plate. [Numerous refs.]

GIGLIOLI (G.). Observations sur la morphologie de l'oeuf et de l'embryon chez *Porocephalus clavatus* (Wyman 1845, Sambon 1910).—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 260–270. With 4 text figs. & 2 figs. on 1 plate.

HINSHAW (H. Corwin). On the Morphology and Mitosis of *Trichomonas buccalis* (Goodey) Kofoid.—*Univ. California Public Zool.* 1926. Sept. 14. Vol. 29. No. 7. pp. 159–174. With 2 text figs. & 1 plate. [16 refs.]

MALARIA BUREAU. No. 4. HEALTH BULLETIN. No. 12. 19 pp. With 21 figs. [7 refs.] Table for the Identification of some Indian Fresh-Water Fish. 1927. Calcutta : Govt. of India, Central Publication Branch.

MARTINI (E.). Ueber die Stechmücken der Umgebung von Saratow.—*Arb. der Biologischen Wolga-Station.* 1926. Vol. 8. No. 4–5. pp. 189–227. With 5 text figs.

OKADA (Jô K.). Un cas nouveau de myiase du tube digestif causé par la larve de *Psychoda B. punctata* Curt.—*Ann. Parasit. Humaine et Comparée.* 1927. Apr. 1. Vol. 5. No. 2. pp. 105–106.

SÉJOURNANT. Envahissement péritonéal par des larves d'hypoderme. Péritonite consécutive.—*Rec. Méd. Vét.* 1927. June 15. Vol. 103. No. 11. pp. 340–342.

TRIFFITT (Marjorie J.). Observations on the Oöcysts of Coccidia found in the Faeces of Carnivores.—*Protozoology.* 1927. Apr. No. 3 (Supp. to *Jl. of Helminthology.* pp. 59–64. With 3 text figs. [14 refs.]

ZUELZER (Margarete). Ueber eine Bartonella-artige Infektion der Feldmäuse.—*Cent. f. Bakt.* I. Abt. Orig. 1927. June 8. Vol. 102. No. 8. pp. 449–453. With 1 coloured plate & 1 text fig. [5 refs.]

## LEPROSY.

MUIR (E.). **Some Factors which influence the Incidence of Leprosy.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 1–14 With 3 maps & 3 graphs. [3 refs.]

The importance of high rainfall and humidity in increasing the incidence of leprosy in large areas has been shown by maps of the world and of India by L. ROGERS. The detailed study of smaller areas by means of the Indian census figures brings out other factors. The figures give reliable indications of the relative prevalence of the disease, although they only include evident advanced cases, so under-estimate the true numbers. The zone on either side of the Bengal-Bihar border has been choosen for investigation since it includes the highest leprosy rates in India, the Bankura Thana having the very high rate of 6·36 per mille, falling to 0·32 to the east and to 0·18 to 0·26 to the west, as shown in a map. Bankura is a famine area owing to the rainfall running off the sloping and porous laterite soil, and the people are poor and live on a diet very deficient in milk and fresh vegetables, but consume much decomposed fish ; the late Jonathan HUTCHINSON was correct in his views regarding the relationship of such fish to increased leprosy, but it is only a predisposing cause, and not the main factor in the production of the disease as he maintained. This is also brought out by the very high leprosy rates of 1·12 in the Chin Hills, and 3·97 per mille in the Arrakan Hills, where decomposed fish is also largely consumed, which are low in neighbouring areas where such fish is not used. Leprosy is also more prevalent in the east of the Central Provinces, with porous soil and frequent famines, than in the west of this province. Deficient diet and the consumption of decomposing food thus predisposes to leprosy by lowering the resisting powers of the people. In Burma and in China, with high leprosy rates, there is great deficiency of milk in the diet, but Chinese patients recover rapidly and invariably in Calcutta on the modern treatment combined with a diet including milk, whole-wheat bread and fresh vegetables. In Bihar and Orissa the very poor Bowri caste has from two to five times as high a leprosy rate as other castes, and they consume decomposing carcases and stale rice. In this limited area there is no relationship between leprosy and humidity and rainfall, indicating impoverishment and bad diet as the causes of the local variations. In certain leper asylums with deficient rice diet treatment cannot be expected to give good results, but where gardening and farming allow the inmates to supplement their diet the conditions are more favourable for treatment. Most town leprosy is imported, and the strongholds of the disease in the country must be discovered and dealt with if its prevalence is to be reduced.

L. Rogers.

MUIR (E.). **Leprosy in the Bengal-Bihar Border Line.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 440–442.

This note gives further data on the lines of the above paper, and emphasizes the necessity of making a careful survey of the local incidence of the disease, and of supplying dispensary treatment in the main foci of infection if the influx from them into Calcutta and other towns is to be cut off; doctors especially trained for the purpose should be supplied.

L. R.

SANTRA (Isaac). **Report on Leprosy Survey Work at Manbazar Thana, District Manbhum, Bihar and Orissa.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 442–444.

This paper deals with such a survey as Dr. MUIR advocates in the foregoing paper. This is a badly affected area. After a list of the known lepers had been obtained, different infected villages were visited, and a lantern lecture given as propaganda work, after which contacts were sought, school children examined, and a dispensary for treatment of lepers opened, with the result that at the end of two months 170 patients had attended. This success led the District Board to open two more clinics, and 633 cases were found, 301 of whom were early ones, excluding 37 refusing examination; the more advanced cases numbered 295 against 237 previously returned by the village watchmen in the census return. There were thus about twice as many total cases as they had enumerated, nearly all the excess being early cases which they could not be expected to find. Attempts are being made to improve the diet of the people, and periodic examinations of the children of lepers are being made to detect the development of leprosy while in the early amenable stages, and also of school children and servants, who often introduce the disease into houses. Two to four days a week are devoted to treatment and the rest of the time to propaganda work. The root of the disease is thus being struck at in the country areas of high leprosy prevalence. These measures are well worthy of imitation in other infected countries.

L. R.

SOUTH AFRICA, UNION OF. **Annual Report of the Department of Public Health Year ended 30th June, 1926.** [MITCHELL (J. Alexander).]—67 pp. With 1 coloured map. 1926. Pretoria. [Leprosy pp. 18–34.]

This valuable report contains the results of a leprosy survey of South Africa through inquiries by the local magistrates, which showed a total number discovered and certified during a fifteen year period ending June, 1924 of 6,792, of which the Transvaal showed the highest figure with 2,355. Further 1,029 were returned as remaining in their own homes, and it is estimated that 2,240 were at large undiscovered and uncertified. It is stated that these figures are probably too low owing to early cases not being recognized or reported. The number of cases developing annually is about 450, and the total number of lepers in the Union at the present time is estimated at 5,170, or 0·07 per mille. Further, 57 foci of infection were reported from 32 districts, in 12 only of which districts the disease is said to be increasing. The disease appears to be decreasing among the European and mixed coloured races. The lepers segregated in institutions numbered 2,158 in June, 1924, of whom 147 were Europeans and 177 coloured, the rest being natives except for 8 Asiatics. The average duration of the disease before segregation was 6·70 years in Europeans, 7·13 in natives, and 6·64 for all races, and the average age at the time of segregation was 33·12 years, with little variation in the different races except that it was higher in Asiatics. A table of contacts with leper relations and others brings out the well-known fact that the younger generation are most frequently infected from the older or from brothers or sisters, confirming the fact that the great majority of infections take place during childhood or early adult life. A table of the first symptoms noticed among 2,153 segregated patients shows spots, patches or macules in no less than 982, nodules in 231, and redness and itching in 167. In the remaining 778 nerve symptoms first appeared, in the great majority as severe pains in the limbs, ulceration or numbness of hands or feet, in that order of frequency. It is noted that the vitally important point brought out by the tables is the long average period of about six and a half years between the appearance of the first symptom and the segregation of the patient, and this is considered to be very probably under rather than over stated, and that the true average is nearer eight years, during the early periods of which the disease is usually most infective.

The author concludes: " The lesson of all this is obvious. Until we can devise some system or method of securing *early discovery* [italics in the original] and the early institution of precautions, we cannot hope effectively to limit the spread. I am satisfied we shall never achieve this by methods of compulsion: we must secure the voluntary co-operation of the native peoples." He goes on to suggest keeping in close touch with contacts and examining them every six months or so for a period of five or six years after the removal of the original infective case from the household, and then the " spread of leprosy in the Union would very soon be checked and reduced." [This is the measure strongly advocated by the reviewer in his section on prophylaxis of Rogers and Muir's book on leprosy, page 134.] Further on he writes : " Practically all patients in institutions are now receiving active anti-leprotic treatment by various modern methods : preparations of chaulmoogra oil and its derivatives are being used with encouraging results, especially in early cases." Patients are more hopeful and are beginning to come forward in the earlier stages for voluntary admission, but much remains to be done, and it is hoped to undertake field investigations before long. Many uninfective old nerve cases have been released, as noted in earlier reports, and the progress of the South African efforts to control leprosy on modern lines will be watched with great interest. They should encourage the adoption of similar enlightened measures elsewhere.

L. R.

LABERNADIE (V.). Contribution à l'étude de la lèpre en Guyane française. [**Leprosy in French Guiana.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 306–311. [8 refs.]

——. La lèpre en Guyane française. (Deuxième mémoire).—*Ibid.* June 8. Vol. 20. No. 6. pp. 489–502. [5 refs.]

After describing the earlier very unsatisfactory conditions in this colony, the author points out that it is only since 1900 that serious studies of the disease have been made here since formerly the belief in the hereditary theory paralysed all efforts, and the conditions in the island settlement at Acarouany were extremely bad, no adequate treatment being provided. In 1922 the services of a bacteriologist were made available and a dispensary for treatment was opened in connexion with a neighbouring Hygiene Institute. When confidence had been induced by sympathetic measures, the villages around Cayenne were visited and the number of cases under observation steadily increased from 71 in the second half of 1923 to 371 in that of 1925, and over 3,500 injections were given in the two years, mainly among villagers attending voluntarily as out-patients.

In his second paper the author records that in 1920, 83 lepers were enumerated by HENRY as living in Cayenne, but there were very few children among them, indicating the omission of many cases. From 1913 to 1925 the children have been examined in schools, and a number of early cases found. In January 1925 a total of 221 had been found, 209 of which were in blacks and mixed races, and during 1925, 90 new new cases, bringing the total to about 300, among the 12,000 inhabitants of Cayenne, or 25 per mille; a very high rate. He estimates the total numbers among the 30,000 people in the colony at 900. Cases occur not infrequently among the convicts sent to French Guiana, and with a few exceptions the disease has only developed after six or seven years' residence in the colony. In the children examined by him the disease was found from 2 years and 9 months upwards, but more frequently at the ages of five to ten years. A case is recorded of an infant separated from leper parents at the age of one month, who developed leprosy at the age of 3 years, showing very early infection, as in some recorded Philippine cases. The incubation period may thus be under three years in children. Experience shows that contagion occurs in families and from domestic servants, and that close and prolonged exposure is usually necessary. The first lesions were usually found on the face or extremities as in other countries, but the nasal mucous membrane is not infected until after the skin, and examination of the nasal mucus was never positive unless the skin lesions were also so.

L. R.

ARAUJO (H. C. de Souza). O problema da lepra. Como resolvel-o no Brasil [**Suggestions for dealing with the Problem of Leprosy in Brazil.**]—*Sciencia Med.* 1927. Apr. 30. Vol. 5. No. 4. pp. 191–197. Also in *Rev. Med. Cirurg. do Brasil.* 1927. Apr. Vol. 35. No. 4. pp. 132–139.

This article contains nothing really new. The aim in general is to establish leper-colonies and dispensaries in sufficient number. The smaller and impecunious districts might combine, with Government assistance for upkeep. For the well-to-do private sanatoria could be inaugurated on a more lavish scale. Inspectors should be appointed to find out cases in order that they might be dealt with on proper lines according as the patients were in an early stage, or non-infective, or actually a menace to others.

It is suggested that ten large colonies should be set up to take an average of 2,000 patients. These colonies should consist of small cottages to house two or four patients, and sites such as would afford horticultural or floricultural occupation.

The dispensaries would be of great use for the instruction of medical men wishing to specialize and also for the training of attendants.

H. Harold Scott.

Cool (P.). Regeerings-maatregelen ter bestrijding der lepra in Suriname en Ambon [**Government Regulations for the Combating of Leprosy in** Surinam and on Amboina.]—*Nederl. Tijdschr. v. Geneesk.* 1927. May 7. 71st Year. 1st Half. No. 19. pp. 2453–2456. [1 ref.]

In both places leprosy is not recognized by the population as an infectious disease, and this misbelief seriously mars the Government attempts to isolate the sufferers. In Surinam these attempts have led to a fairly complete failure [see also Wolff, this *Bulletin*, Vol. 23, p. 508], and the author is opposed to similar regulations for Amboina, where he does not expect more favourable results. If the Government decides to enforce isolation, it must be prepared to meet a good deal of opposition and take adequate measures (isolation on an island). Otherwise the combating of leprosy can only be based upon education, general sanitation and improved living conditions. The last offers great difficulties in a country like Amboina, where the sago-tree culture makes the conditions of living very easy.

W. J. Bais.

Maire (Georges) & Pinto (David). Contribution à l'étude de la lèpre en Syrie. [**Leprosy in Syria.**]—*Rev. Méd. et Hyg. Trop.* 1927. Mar.–Apr., & May–June. Vol. 19. Nos. 2 & 3. pp. 33–52. With 1 map in text; pp. 65–76. [22 refs.]

This is an interesting account of the disease in an area with comparatively few cases, although it dates from Biblical times. The history of the disease is given and the ancient methods of isolation and treatment mentioned. In 1921 11 cases were met with in Aleppo, but leprosy appears to be unknown among the wandering desert Arabs. The main focus appears to be in the Lebanon Mountains among the Jebel Druse tribes, and a few scattered cases are met with in the towns and villages of other areas. Muir's E.C.C.O. mixture has been used with some benefit in nodular, but none in nerve cases.

L. R.

Breger. Lepra in Frankreich. [**Leprosy in France.**]—*Deut. Med. Woch.* 1926. Nov. 5. Vol. 52. No. 45. pp. 1910–1911.

The writer considers the possible danger to Germany of the large number of lepers in France, and the absence of any laws for their compulsory notification and segregation or control. He quotes Jeanselme's figures showing that between 1910 and 1925 140 lepers were treated at the St. Louis hospital in Paris; there are believed to be 200 cases in that city alone, nearly all imported from the French colonies. However, he concludes that under the favourable climatic and sanitary conditions in France, there is very little danger of infection from leprosy and, as the patients are very unlikely to visit Germany, he does not think they are any real menace to that country.

L. R.

Pineda (Eloy V.). **Studies on Negative Lepers, I: the Persistence of the Bacilli in Deep Foci.**—*Jl. Philippine Islands Med. Assoc.* 1927. Apr. Vol. 7. No. 4. pp. 109–111.

A further study of negative lepers has been made by means of gland puncture, and by examining the tissues after death from some intercurrent disease, and the results are recorded in this paper. In fifty-three cases, which had completed their two year period as negatives prior to discharge, gland puncture of enlarged femoral lymph nodes was made with a glass syringe containing a small quantity of 1 per cent. cocaine solution, a little of which is injected before the needle is moved about to break up the gland pulp prior to applying suction. In 9, or 17 per cent., a few bacilli were found, but never in masses or globi. Eleven autopsies were done from five to seventeen months, with an average of eleven, after the patient had become negative to skin tests, and ten bodies were found to harbour acid-fast bacilli, seven times in the ulnar nerve, five times in lymph nodes and once each in the liver and spleen, three times in the testes out of eight males and once in the tonsils and prostate in three and two examinations respectively; they were especially numerous in the testes and fairly numerous in the nerves and glands. It is not considered that these findings indicate the need of change in the length of the negative period of detention, since experience shows that cases developing sufficient resistance to become negative for two years "will continue to hold the organisms in check, if not overcome them entirely."

L. R.

WADE (H. W.) & SOLIS (F.). **Studies on Negative Lepers, II: the Importance of Nasal Lesions.**—*Jl. Philippine Islands Med. Assoc.* 1927. Apr. Vol. 7. No. 4. pp. 111–115. [8 refs.]

The authors agree with the present view of leprologists that the nasal mucous membrane is very rarely the site of the primary lesion of leprosy, but they consider that such lesions are more important in the examination of patients becoming negative than has hitherto been suspected, and they record important data derived from the examination of patients reported as negative after treatment. The nasal mucosa should be actually scraped until abraded, as simple swabbing is not sufficient in non-ulcerated cases, both nostrils being examined, and they use a tiny incision with as little blood as possible in examining skin lesions for lepra bacilli. Of 600 patients examined at the request of the treating physicians in no less than 152 or 25·4 per cent. the nose was found to be positive, and they formed 44·6 per cent. of the total number found positive in some site. A further 570 patients previously found to be negative by skin tests were also examined, and 55 or 9·6 per cent. gave positive results on examining the septum of the nose, and 5·1 per cent. of all were positive in the septum alone, so that in about 5 per cent. the nose remained positive after the skin was negative. Thus, although in children the nose was never found to be infected before the skin, yet the infection may persist longer in the nose; the nose therefore should always be examined before a case is declared negative.

L. R.

WADE (H. W.) & LARA (C. B.). **Studies on Negative Lepers, III: the Problem of Relapses.**—*Jl. Philippine Islands Med. Assoc.* 1927. Apr. Vol. 7. No. 4. pp. 115–122. [8 refs.]

In the earlier treatment at Culion relapses were frequent, but they are decidedly less so with the present methods. Until recently cases becoming negative bacteriologically were kept under observation and repeatedly examined for two years before release, but now some are paroled after six months, and report at clinics for treatment and observation. Since 1922 the negatives at Culion have been under a special committee, whose records have been analysed, when it was found that of 508 cases, 75 or practically 15 per cent., had suffered interruption, and four cases had two interruptions owing to being found positive, and two-thirds of them were still so; repeated examinations are thus necessary and it is considered advisable to increase the pre-parole periods up to nine to twelve months, since most of the relapses were found at the end of the first six months. The reappearance of infiltrations is practically always at the sites of old lesions, and since it is largely a matter of chance finding the bacilli when they have nearly disappeared " these occurrences should be considered chance interruptions and not as relapses." They will become fewer as the patients become more enthusiastic over the treatment.

L. R.

HENDERSON (John M.). **Gland Puncture Findings in Leprosy.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 438–440. With 1 text fig. [4 refs.]

After references to former work on this line by Philippine and other workers, the author points out that none of them give accurate information regarding the type and stage of the disease in their cases. Working in the leprosy clinic of the Calcutta School of Tropical Medicine he has made gland punctures in 93 cases, only 57 of whom had been under treatment previously. He classified them according to MUIR's nomenclature into A1 and A2 for early and late nerve cases, and B1, B2 and B3 for early, second active stage and third stage, with tendency to improve, of skin cases. A2 cases were all negative, but they only numbered six. B2 and B3 were always positive and 60 per cent. of B1 were also positive. A1 cases showed 10·5 per cent. of untreated and 4·9 per cent. of treated cases positive. In slight infections the bacilli may be missed, so it is not a reliable diagnostic method. Microscopical examinations of removed glands in seven cases were all positive, including the finding of a few bacilli in one case negative on puncture a few days before. Endothelial proliferation of large ovoid cells with pale vesicular nuclei was always found, both in the vessels and the tissues, as shown in an illustration.

L. R.

BARGEHR (P.). Die Selbstheilung der Lepra. [**Natural Cure in Leprosy.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 5. pp. 603–609. [1 ref.] Also in *Muench. Med. Woch.* 1926. Dec. 24. Vol. 73. No. 52. pp. 2209–2210. [1 ref.]

The author deals further with the reactions induced by the application of leprolin, made from leprous nodules, to scarified skin like tuberculin, and records the results in 162 tests. In 82 of these lepra bacilli were found in the lesions of the patients, and in all of them the leprolin reaction was negative; and of 80 showing no lepra bacilli the reaction was also negative in 45, a large proportion of whom showed definite symptoms of leprosy. Among the 35 giving positive reactions are included cases with no signs of leprosy, and those with mutilated fingers and toes, but in good general health and who had shown no change for years, and were healed cases. Positive reactions were also obtained in men who had lived for a long time with lepers, but showed no symptoms of the disease. Negative reactions show there is no immunity to leprosy in those who have never been in contact with lepers, and in lepersin whom there is no formation of antibodies in the system.

L. R.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE. 1927. Apr. Vol. 20. No. 6. pp. 987–1025. (Sect. of Trop. Dis. & Parasit., Dermat. & Therap. & Pharmacol. pp. 111–149). With 16 figs. [10 refs.] **Discussion on the Treatment of Leprosy.** [MACLEOD (J. M. H.), SEQUEIRA (J. H.), PERNET (George), LOW (G. C.), HENRY (T. A.), MUIR (E.), KERR (Isabel), WADE (H. W.) & LARA (C. B.), COCHRANE (Robert), TRAVERS (E. A. O.), HASSON, HALL (F.) & ROGERS (Leonard).

This important joint discussion at the Royal Society of Medicine by the Sections of Tropical Diseases and Parasitology, Dermatology, and Therapeutics and Pharmacology was arranged at the request of the Dermatological Section, which opened it. J. M. H. MacLeod reviewed the subject for the dermatologists, and dated the modern treatment of leprosy from the first leprosy international congress at Berlin in 1897, when the old hereditary theory was abandoned in favour of the contagious one. In 1909 it was declared that while leprosy is not incurable we do not possess a certain cure. He next pointed out that " Since then great advances have taken place, chiefly through the researches of my colleague at the Tropical School, Sir Leonard Rogers, and his associate, Dr. Ernest Muir in Calcutta ; Power, Dean and Macdonald in Hawaii : Denny and Brill, in the Philippines, and others." After pointing out the difficulties in estimating the value of treatment in leprosy, with illustrative cases, he discussed the general, local and specific treatment ; and included under the last class metallic preparations, sera and vaccines and vegetable oils and their derivatives, especially chaulmoogra oil ; and he mentioned the advance made when soluble salts and esters of the fatty acids suitable for injection were introduced, that of *Hydnocarpus wightiana* being now most used. During the past two years he had been using at the St. Giles' Homes for British Lepers certain of these preparations, such as chaulmoogra oil, hydnocarpus oil, E.C.C.O., sodium morrhuate, sodium gynocardate, etc., by subcutaneous and intramuscular injection, but not intravenously owing to the vein trouble that may ensue ; as the result of this experience he thinks it advisable to keep an open mind with regard to the specific action of these remedies, for while some patients held their own and improved in their general health, others were unaffected or showed only temporary benefit, and in none could a cure in the scientific sense be claimed. It was doubtful how far the arrest in some cases was due to the natural course of the disease, and treatment on general hygienic principles may help to increase the resisting powers of the patients.

J. H. Sequeira related a case apparently greatly benefited by " protein shock," which he thinks may be the real cause of the beneficial results in a number of the so-called cures. G. Pernet spoke of his experience in the treatment of leprosy in collaboration with RADCLIFFE-CROCKER and later especially with perchloride of mercury injections, which were disappointing. He thought chaulmoogra oil the best remedy, but did not mention having used the new soluble derivatives. G. C. Low spoke of his experience with MANSON'S cases and subsequently with disappointing results, including two cases treated by recent methods, but he thought protein shock might sometimes have a good effect.

The Dermatological Section speakers were followed by T. A. Henry for the Pharmacological Section, who discussed the chemical composition of the different vegetable oils used in the treatment of leprosy, first studied by POWER. He pointed out that gorli seed oil from West Africa was the only oil containing pure chaulmoogric acid, without the usual admixture of hydnocarpic acid of the other varieties; but pure ethyl chaulmoograte made from gorli seed failed in trials in leprosy. These results, he said, are supported by early observations of L. ROGERS showing that the salts of the higher melting point fractions, mainly chaulmoogric acid, were less effective in leprosy than the lower ones containing more hydnocarpic acid, for the latter will be liquid or nearly so at the body temperature. He next spoke of a Hg33, or myristoxymercuri-*m*-hydroxybenzaldehyde, made in his laboratory, and soluble hydnocarpus oil. E. Muir had used the mixture in Calcutta by injection in syphilitic lepers with very satisfactory results.

The Tropical Disease Section's contributions to the debate were opened with a paper written by E. Muir, in which he first emphasized that we have no specific cure for leprosy in the sense of quinine in malaria and antimony in kala azar; yet "there is a line of treatment which will cause the permanent disappearance of all active signs of the disease in early cases, so that the patient is for all practical purposes *cured*, though, if a marked reduction in his general health occurs later there is always the possibility of a relapse." Leprosy is a more remediable disease than tuberculosis, and leprosy can almost always be diagnosed clinically long before the bacilli can be found in the lesions, when the prognosis is far more favourable than in the corresponding stage of tubercle. Muir's well known lines of treatment by dealing with complicating diseases, diet, exercises, the injection of hydnocarpus oil and its derivatives, external applications and surgical measures, were next described; the necessity of a close acquaintance with the stages and phases of the disease to allow of successful treatment and correct estimations of the value of drugs was emphasized. The fallacies due to limited experience and to the subsidence of acute phases independent of treatment being attributed to drugs were pointed out. His present routine treatment is the intramuscular or subcutaneous injection of 4 cc. gradually increased to 10 cc. of hydnocarpus oil containing 4 per cent. of creosote; and when the full dose is reached without local or focal reactions, 1 per cent. sodium hydnocarpate in doses rising from 2 to 10 cc. is given intravenously, the oil being returned to when a reaction is obtained or the veins become blocked; an alternation of the two methods is best. The drugs may be pushed safely to cause reactions in the first and third stages, but caution is necessary in the active second stage to avoid dangerously severe reactions with spread of the lesions. Considerable experience, such as is only obtainable in the endemic areas, is therefore essential to enable the best results to be obtained. For the severe pain of nerve cases intramuscular injection of 3 or 4 minims of 1 in 1,000 adrenalin chloride is of value, and greatly thickened nerves may be benefited by incision and freeing the nerve from the surrounding tissues. Repeated negative bacteriological examinations, and disappearance of all erythema from the macules, with absence of change in the anaesthesia for six months, are the criteria of the disappearance of all active signs; after which treatment may be stopped and the patient watched for two years. A table is given of 64 cases remaining free from all active signs for one to five years, 36 of whom have been well for three to five years; and it is stated that if all those treated could have been followed up the number would have been four or five times as large, indicating lasting results.

He concludes that in spite of the absence of a certain specific cure " by carrying out treatment along the lines indicated above we can hope for a permanent disappearance of all active signs in almost all patients in whom the disease is recognized early. While in the later stages, although much more prolonged treatment is necessary, very promising results are obtained and many have become entirely better and have remained so for periods of several years." It follows that the treatment of many early cases at clinics, as in Calcutta and many other places in India, " is cutting off to a large extent the bacillary reservoirs which would have served to infect the next generation . . . I think we already have in our hands a line of treatment which will aid the rapid disappearance of leprosy from India and from the world, though delay is inevitable, due to the ignorance and backwardness of certain classes of the community."

Sixteen striking photos before and after treatment in different stages are given, which leave no possible doubt of its value in experienced hands.

The next paper by H. W. Wade and C.B. Lara, Chief Pathologist and Chief Physician to the Culion Leper Colony in the Philippines, was communicated and read by L. Rogers, and dealt with the results of the modern treatment in nearly 6,000 cases at Culion and nearly 3,000 at Manila, so is of the greatest importance. After defining a leper they record that the first favourable results of the Mercado mixture intramuscularly, reported by V. G. HEISER, were not altogether confirmed by later experience, as most of the 24 patients who became negative under it apparently relapsed, for only four treated cases were released in 1913 after being negative for two years; the treatment was decidedly heroic. After the introduction of the ethyl ester chaulmoogrates intramuscularly they have been used very extensively, advanced cases averaging 8 years in duration being treated at Culion, and earlier ones at the San Lazaro Hospital at Manila; the number discharged from the later on parole as negative averaged 50 a year during the last five years, and reached 150 in 1925; while 76 more were parolled in the last three years at the small Cebu detention camp. Among the advanced Culion cases by the beginning of November, 1926, 629 negative cases had been obtained, or about 10·5 per cent. of those treated, which all the releases to the end of 1926 will bring up to 800. Moreover, relapses have been few, and are becoming still less frequent with increased experience. From 1913 to 1921, 88 cases were discharged, and between 1922 and 1926 634, but the former only after being negative for two years, so the figures are not quite comparable.

The authors conclude that the ethyl esters are certainly more effective than the Mercado mixture, and " the modern treatment methods are decidedly superior to the older ones, and seem to be particularly effective in early cases. Though they are admittedly much less effective in well-established advanced cases, the results obtained in the Philippine Islands during the last few years show that a not inconsiderable proportion of such cases (probably 15 to 20 per cent.) can be ' apparently cured ' if treated intensively, under proper conditions. This is a noteworthy advance, however discouraging to anyone treating any particular small group of unselected cases. In view of the impressive total, which all 1926 releases will bring to 800 or more, one cannot, we submit, deny the relative effectiveness of present treatment, or its absolute value in properly selected cases. It were quite as correct to deny the value of surgery in cancer. In leprosy, as in cancer, emphasis must be laid on getting the patient early. It is from this point of view that treatment is now revolutionizing anti-leprosy campaign systems."

Isabel Kerr contributed the third paper of the Tropical Diseases Section on the results obtained at the model Dichpali Institution, India ; she recorded 17 and 19 per cent. respectively of cases becoming quite negative after treatment in two series of cases each spread over two years, no case that could possibly benefit being refused treatment, and she concluded that " most cases of early leprosy do well, and one can count on a large percentage of successes." She also agrees with Muir that third stage cases improve rapidly, and that with protracted careful treatment second stage cases also improve, 45 to 47 per cent. having been " very much improved " in addition to the recoveries ; no less than 63 per cent. of the bacteriologically positive infective cases became non-infective under the treatment. This must result in greatly fewer new cases in the near future.

Robert Cochrane, as the result of a prolonged tour in the East, studying over 10,000 cases, was in agreement with the statements of E. Muir, for of the various treatments he had seen, Muir's creosoted hydnocarpus oil was both the cheapest and most effective remedy. Of 20 cases the speaker had discharged as recovered, none had relapsed eighteen months after the discharge of the last, and all were working as ordinary folk. E. A. O. Travers advocated once more the Chinese treatment with powdered *Hydnocarpus anthelmintica* nut, given orally with a small portion of cannabis indica ; by which simple means he had obtained 11·5 per cent. of negative cases at the Kuala Lumpur leprosy institution in the Federated Malay States. The daily doses could be given out to 350 lepers in half an hour. Hasson in a few words reiterated his opinion that his " vaccine was absolutely specific " ; the only such claim made in the debate. F. Hall from his experience in charge of the Leper Asylum in Fiji considered that there was no specific treatment for leprosy, and that all treatments producing sensitization or reaction are harmful.

L. Rogers replied for the Tropical Diseases Section, and pointed out that MacLeod's cases, as reported in the tables he showed, were nearly all residual resistant advanced cases in which various treatments had previously been tried without effect ; so they were the most unsuitable cases for trial, any want of success being thus explained. The case recently reported by Graham LITTLE as cured by Hasson's vaccine was a temporary exacerbation in a partially immune third stage one, which Muir has shown clears up by itself ; so it affords no evidence of the value of the treatment ; while Muir had just written to say that he had tried the vaccine sent him by Hasson in a favourable case with complete failure. Rogers then summarized the results recorded in the papers submitted in the Tropical Diseases Section papers, and some other recent trials, in the following table, and he pointed out that the data brought out the facts that in advanced cases only 10 to 20 per cent. became bacteriologically negative. In earlier ones treated at the Kalihi hospital at Honolulu, and at the clinics of MUIR and himself at Calcutta for six months or more, 30 to 40 per cent. were apparently cured ; the highest rate being 41 per cent. in the only series treated by the soluble sodium salts of the chaulmoogra series of fatty acids intravenously by the speaker. This method had been little used since his early work, on account of the blocking of the veins it often induced; but G. A. Perkins, the Culion expert chemist, had recently stated that it is the most active method, by which effective treatment was first obtained in a large group of cases; the gradual obstruction of the veins appeared to be the main reason against its extensive use at the present time. The speaker was glad to be able to announce that this difficulty had at last been overcome, as an unirritating hydnocarpate of soda had been prepared for him by T. A. Henry, which was painless on subcutaneous and intramuscular injection in the usual 3 per cent. solution, and also nearly unirritating to the veins in a 1 per cent. solution, but quite effective by all three methods; much more so than the ethyl esters in his limited recent experience, while Muir had now adopted it as part of his routine treatment. It had a further great advantage of

TABLE OF CASES TREATED WITH INJECTIONS OF CHAULMOOGRA OIL DERIVATIVES.

| Place and Observer. | Years. | Cases. | Apparently cured. | Per cent. cured. | Much improved, per cent. | Improved, per cent. | Not improved. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Manila (H. W. Wade) | 1921–5 | (2,990) | 356 | — | — | — | — | (1,511 sent to Culion.) Average duration, 2·65 years. |
| Culion (C. B. Lara) | 1921–6 | 6,000 | 629[1] | 10·5 | — | — | — | (Average duration, 8 years.) |
| Honolulu (*U.S. Report*) | 1920–4 | 394 | 124 | 31·47 | — | — | — | Paroled, only 13 relapsed, of whom 7 had not continued treatment after parole. |
| Calcutta (E. Muir) | — | 203 | 43 | 21·18 | — | — | — | Cases treated, 3 months or more. |
| | | 123 | 38 | 31·0 | — | — | — | Cases treated, 6 months or more. |
| Dichpali (I. Kerr) | 1923–4 | 180 | 30 | 17·0 | 45·0 | 35·0 | 3·0 | 63 per cent. became uninfective. |
| | 1925–6 | ? | — | 19·0 | - - | — | — | Discharged, improved. |
| Japan (K. Shiga) | 1921–3 | 211 | 23 | 10·9 | 14·2 | — | — | — |
| Siam (O'Brien) | 2 years | 357 | — | — | 21·7 | 48·6 | 29·6 | Duration, 1 to 3 years. |
| | | | | | 23·3 | 49·4 | 28·2 | Duration, + 3 years. |
| New Caledonia (Genevray) | — | 70 | 6 | 8·75 | 31·4[2] | 11·4 | 48·6 | 90 per cent. improved. After 18 months only 5 relapsed. |
| Korea (R. W. Wilson) | — | — | 75 | — | — | — | — | |
| Calcutta (L. Rogers) | 1915–19 | 51 | 21 | 41·2 | 39·2 | 17·6 | 2·0 | Na hydnocarpate intravenously. |

[1] By end of 1926 the apparently cured would exceed 800.

[2] 17·14 classed as "nearly cured."

rapid absorption, and, still more important in the tropics, its cost per dose worked out at about one-twentieth of that of a good ethyl ester. Large amounts had been sent out for trial, and if his experience was confirmed an important practical advance would result. [Since this discussion MUIR has written to the reviewer to say that all vein trouble can be avoided, even with a 2 per cent. sodium hydnocarpate solution, by the simple expedient of drawing up about as much blood as the dose, rotating the syringe on its long axis to mix, and injecting the whole; up to 7 cc. having been given thus with only slight temporary giddiness.]

L. R.

HOFFMANN (W. H.). Die Goldbehandlung der Lepra. [**Gold Treatment of Leprosy.**]—*Muench. Med. Woch.* 1927. Mar. 11. Vol. 74. No. 10. pp. 405–406.

This paper deals with the use of Krysolgan in leprosy, and comes to a similar conclusion regarding its special value in the serious eye lesions of the disease, as in tuberculosis. The author reports that in a number of lepers with eye complications he obtained complete resolution of the signs of irritation, and he has no doubt as to its value, for benefit may result after even one or two injections; photophobia also disappeared and all pain ceased, together with the fear of going blind. The drug is made by E. Schering of Berlin, and is easy to use. He thinks a larger experience is necessary before coming to a final conclusion of its value.

L. R.

KUPFFER (A.). Ueber die Behandlung der Lepra mit Krysolgan. [**Treatment of Leprosy with Krysolgan.**]—*Med. Klin.* 1927. Mar. 11. Vol. 23. No. 10 (1161). pp. 364–365.

Krysolgan acts mainly on the eye lesions of lepers and also produces general improvement. It is given as in tuberculosis, the doses beginning with 0·001 gm. and gradually increased up to from 0·01 to 0·02 gm. injected every fourteenth day at first, and later every eighth day, with occasional intervals of a few weeks. Reactions occur as in tuberculosis, but are not so severe. In some macular cases there is numbness for a few hours. No local reaction occurs, except after two to seven days in the lesions, very slight in macules, and lasting two or three days in the form of increased redness, especially at the margins. In nodules swelling takes place, and in healthy parts of the skin papules or erythema with heat and redness and even vesicles may appear. The most important results are lessening of any inflammatory affection of the eyes with decreased pain and photophobia; episcleritis may disappear and cloudiness of the cornea resolve, lepromata gradually disappear and the pupils become clear again with improved vision. Lesions of the skin and mucous membranes may also improve, and one patient regained his voice; skin ulcers healed.

L. R.

PALDROCK (A.) & RÄNGEL (A.). Zur Sanokrysinbehandlung der Lepra. *Dermat. Woch.* 1927. Mar. 12. Vol. 84. No. 11. pp. 372–374.

—— & ——. **Sanocrysin Treatment of Leprosy.**—*Amer. Jl. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 241–245. [Univ. Skin Polyclinic, Tartu, Esthonia.]

Three cases of nodular leprosy have been treated by sanocrysin in total quantities of 4·5, 5 and 6 grams intravenously. Fever and general reactions were produced with headache, nausea, vomiting, palpitation and weariness, followed soon after by skin reactions. Before and at monthly intervals during the treatment lipase estimations were made, but no significant increase was produced. " The Sanocrysin treatment did not cause the disappearance of nodules nor did it modify their appearance. It showed no curative effect, though it caused a rise of temperature and general and cutaneous reactions."

L. R.

RANGEL (Doutorando Mario). O tratamento da lepra pelo " Antileprol." [**The Treatment of Leprosy by " Antileprol."**]—*Rev. Med. Cirurg. do Brasil.* 1927. Feb. Vol. 35. No. 2. pp. 43–45.

Good results have been obtained at the São Sebastião Hospital by intramuscular injections of Antileprol every two days, but for the last year the intravenous route has been employed and is recommended for the following reasons: (1) It is free from risk; the fear of emboli from injecting an oily substance into the veins has proved groundless. (2) Pain and local reaction are avoided. (3) The amount introduced into the system can be accurately determined, whereas with intramuscular injection an uncertain proportion may remain unabsorbed.

More detailed account of the results will be published when this method has been employed for a longer period.

H. Harold Scott.

TREUHERZ (Walter). 4 Jahre Erfahrungen mit intravenösen Injektionen von Antileprol (Bayer), kombiniert mit 2% iger Brechweinsteinlösung intravenös gegen Lepra. Eine Studie. [**Four Years' Experience of Antileprol and Tartar Emetic intravenously in Leprosy.**]—*Dermat. Woch.* 1927. Mar. 19. Vol. 84. No. 12. pp. 394–404.

The author has found that from 0·1 to 0·3 cc. of antileprol can be injected intravenously without symptoms; in girls of 16 to 20 years of age 0·4 cc. produce coughing, and larger doses cause dyspnoea and other distressing symptoms; in males over 40 from 0·8 to 1·2 cc. can be injected every other day without serious trouble and with good effects. This may be alternated with 2 to 3 cc. of a 2 per cent. solution of tartar emetic, each being injected intravenously every fourth day. The effects are seen not in a change in the skin lesions or in general improvement, but are due to a change in the lepra bacilli producing greater resisting powers with longer intervals between the naturally occurring exacerbations of the disease. Good results were obtained in macular cases.

L. R.

HOFFMANN (W. H.). Die Behandlung der Lepra mit Antimon. [**Treatment of Leprosy with Antimony.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Mar. Vol. 31. No. 3. pp. 139–141.

The author states that we now have a simple and reliable treatment for controlling leprosy, the chaulmoogra oil preparations being specific. He finds antimony is also a useful drug in combination with the chaulmoogra preparations, the two attacking the disease from different sides ; and he has used for this purpose von Heyden stibenyl, antimosan and stibosan intravenously. He thinks, however, that the chaulmoogra ethyl esters are the more active remedy.

L. R.

DE NOVAES E SILVA (Severino). Tuberculinotherapia da lepra pela T.O.A. do Instituto Oswaldo Cruz. Experiencias clinicas feitas. [**Treatment of Leprosy by Tuberculin T.O.A.**]—*Rev. Med.-Cirurg. do Brasil.* 1927. Mar. Vol. 35. No. 3. pp. 83–98. With 3 charts.

Brief records are given of three cases of leprosy, of the mixed form. treated by tuberculin.

(1) A man, 28 years of age, in whom the disease had existed for 11 years. He had been treated by chaulmoogra (nature not stated), by Antilebrine and by 58 injections of Antileprol intravenously. All treatment was suspended for 25 days prior to starting T.O.A. Injections were given intramuscularly once a week. 1 cc. of the " sixth dilution " was the initial dose and was well borne. The second caused drowsiness and a rise of temperature. With later injections the nasal discharge improved and some of the nodules cicatrized, but the maculae were unaltered. These, however, began to clear with the " fourteenth dilution " and after the nineteenth they diminished in size and the sense of touch and pain began to return. (2) A man of 41 years had had the disease for 6 years, for which he had received chaulmoogra oil by mouth and later 36 doses by injection. After 40 days' interval T.O.A. was begun. The first injection of sixth dilution produced focal and general reaction. After the eighth dilution the nasal discharge ceased and adherent crusts formed. After the ninth, the nodules diminished in size, and after the fifteenth the maculae began to react. (3) A man of 33 years, a leper for 12 years, general condition good ; had had one injection of chaulmoogra oil and one series of Antilebrine, with slight improvement. T.O.A. was started after an interval of 10 days. After the first dose there was a focal reaction with an increase of the nasal secretion and drowsiness. Some improvement followed later injections, but the reaction became virulent and treatment was suspended after 3½ months.

The results showed that leprous patients react to tuberculin, and that both nodular and macular forms are benefited. [Unfortunately we can find no indications as to the constitution of the dilutions referred to, except that the higher numbers appear to indicate greater concentration.]

H. Harold Scott.

OSAWA (Y.). & NOJIMA (T.). Sympathektomie an Leprakranken. [**Sympathectomy in Leprosy.**]—*Deut. Med. Woch.* 1927. Jan. 7. Vol. 53. No. 2. pp. 65–67. With 2 text figs. [11 refs.]

Operations for removal of the cervical sympathetic nerves in cases of ulnar leprosy, and of the periarterial sympathetic nerves of the femoral arteries in cases of nerve leprosy of the lower extremity are reported, one of the femoral operations having been followed by septic infection and death from secondary haemorrhage. It is claimed that healing of ulcers was promoted by the operation, an ulcer of a finger of five months' duration healing in five weeks, and perforating ulcers of the foot of four and six months' duration healing in ten to fourteen days. Absorption of infiltrations both of the skin and of nerves may also be marked, and discolouration of the skin may improve, as well as ulnar neuralgia ; but there was no recovery of sensation.

L. R.

TISSEUIL (J.). O tratamento da lepra pela ionisação. [**The Treatment of Leprosy by Ionization.**]—*Rev. Med.-Cirurg. do Brasil.* 1927. May. Vol. 35. No. 5. pp. 185–191.

Rats with rat-leprosy from infection with *B. pulviformis* were treated with various metals by ionic medication. The results were far from satisfactory. With silver salts the lesion increased in size and the condition was aggravated ; with copper salts, after an initial increase, a diminution occurred, but this beneficial effect was not maintained and extensive ulceration developed. Gold salts caused marked and progressive increase in the size of the lesions as compared with the controls.

[Had the results been favourable, it would not necessarily follow that human lepers would react in the same way.]

H. Harold Scott.

BARGEHR (P.). Das Blutbild bei Lepra. [**The Blood Picture in Leprosy.**]—*Arch. f. Dermat. & Syph.* 1926. Vol. 152. No. 2. pp. 462–464.

The examination of the blood in 130 lepers showed that the erythrocytes were little changed, the blood platelets were numerous; and the basophile leucocytes numbered up to 0·2 per cent. The differential leucocyte count showed that the eosinophiles varied between a few and 60 per cent., being frequently up to 25 per cent. or more, but in 6 per cent. they were below normal. The neutrophiles were normal in slight cases ; myelocytes were rare and the monocytes were about normal. The changes were not of much diagnostic value.

L. R.

PAIS (Luigi). Sierologia nella lepra. Nota Ia. [**Serum-Reactions in Leprosy.**]—*Giorn. Ital. di Dermat. e Sifil.* 1927. Feb. Year 62. Vol. 68. No. 1. pp. 84–108. [28 refs.]

The author carried out various serological examinations with the blood of 29 leprous patients, of whom 11 were of the nodular type, 3 anaesthetic, 13 mixed, and 2 in the very early stage (children of a leprous mother and living with her). The sera were examined by the Wassermann reaction, Jacobsthal's cold-fixation method, the Sachs-Georgi, Meinicke's flocculation and Bruck's and, lastly, Meinicke's turbidity reaction.

For lepra antigen small nodules were macerated in 95 per cent. alcohol for 3 days at room-temperature and the filtrate employed. For syphilitic antigen an alcoholic extract of guineapig's heart was used ; for the Sachs-Georgi method cholesterinized ox-heart.

Of the 24 cases of nodular and mixed forms 10 sera had an anticomplementary action in greater or less degree. The author ascribes this, in part at least, to the chaulmoogra oil used in treatment, because it was greater in those actually undergoing treatment, but did not occur in those who had ceased treatment some time previously. Anaesthetic patients' sera gave complete haemolysis. By the Jacobsthal method 5 out of 11 cases gave a positive result with lepra antigen.

Of the flocculation methods, the Meinicke test (D M R) proved negative in all; by the Sachs-Georgi 18 per cent. were positive; these and all the positive results with the Bruck test are regarded by the author as autotropic, on account of the anticomplementary-autoflocculation action of the serum. Lastly, the Meinicke turbidity reaction proved, like the D M R, negative in all. The results of the individual tests are presented in tabular form.

H. Harold Scott.

VILANOVA (Xavier) & CATASÚS (J. M.). Estudios sobre lepra. (la Nota). Serologfa. [**Studies on Leprosy. Note 1. Serological.**]—*Rev. Méd. Barcelona.* 1927. June. Year 4. Vol. 7. No. 42. pp. 592–597. [53 refs.] [" Instituto Profiláctico " Barcelona.]

The authors regard the following facts as established: (1) The serum of leprous patients possesses the power of fixing complement in the presence of various antigens; (2) the discordant results recorded by different investigators are due largely to the varying techniques employed; (3) the positive results are not affected by antisyphilitic treatment nor by the drugs regarded as specific for leprosy; (4) Nodular leprosy gives a higher percentage of positive results than the anaesthetic or nervous types; (5) Eitner's reaction is not specific.

The authors themselves investigated sera from 23 patients, 16 of the nodular form, 4 of the mixed, and 3 of the nervous, by the methods of Wassermann, Jacobsthal, Hecht, Meinicke, and Vernes. With the two first, 9 of the nodular and 3 of the mixed proved positive, all the purely nervous negative. Meinicke gave constantly negative results in all. The Vernes reaction, carried out strictly in accordance with the originator's instructions, gave very high figures. These facts are presented in tabular form.

The moral to be drawn is that the close analogies revealed between the results of some of the tests by leprous and syphilitic sera may lead to error if the diagnosis be based on one of these tests only.

H. Harold Scott.

SAKURAI (H.). Pri l'Seroreakcio kaj Fermentoreakcio de Lepro. [**Serum and Ferment Reactions in Leprosy.**]—*Japan Jl. Dermat. & Urol.* 1926. Apr. Vol. 26. No. 4. Esperanto summary pp. 9–10. [In Japanese pp. 281–306. 14 refs.]

The writer has tested the several forms of Wassermann reactions in 139 nodular and 49 nerve lepers, and found the percentage positive varied from 18·5 per cent. with the Sachs-Georgi method, through 42·8 per cent. with Wassermann test with ER. Lecithin, to 96 per cent. with Kolin R. in nodular cases; and from 10 to 96 per cent. in nerve types; but leprosy cases reacted very irregularly with different tests, while syphilitic sera gave much more uniform results. The ferment test of NOJIMA proved not to be specific for leprosy.

L. R.

GOMES (J. M.). Desvio do complemento na lepra com o Streptothrix leproide de Deycke desengordurado. [**Complement Deviation in Leprosy with Defatted Streptothrix Leproides Deycke.**]—*Rev. Biologia e Hyg.* São Paulo. 1927. Vol. 1. No. 1. pp. 17–36. English summary pp. 37–38. [10 refs.]

This work is on the lines of that of TAYLOR and MALONE on complement fixation with fat-free tubercle bacilli. The Deycke organism was defatted by McJunkin's method with olive oil and acetone, and it is claimed that 82·29 per cent. of lepers sera gave positive reactions, and other skin diseases gave negative ones.

L. R.

DUNSCOMBE (W. K.). **The Serum-Formalin Reaction in Some Cases of Leprosy.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 512–513. [1 ref.]

Tests in 38 cases, including all stages of treated and untreated cases, showed great variations in the reaction, so that contrary to the opinion of DYE [see this *Bulletin,* Vol. 23, p. 894], the test is not reliable for diagnostic and prognostic purposes.

L. R.

CALATRONI (R.). Vérification de la valeur d'une nouvelle méthode pour le diagnostic de la lèpre. [**Value of a New Method for Diagnosis of Leprosy.**]—*C.R. Soc. Biol.* 1927. July 1. Vol. 97. No. 21. pp. 264–265.

In the complement fixation method tested the red corpuscles of the patient were used in the place of the serum, and the serum of a rabbit prepared with the red cells of subjects attacked, a positive reaction consisting in the production of haemolysis, instead of the reverse with the Wassermann test. As the results were entirely negative in leprosy the details of the test do not require to be described.

L. R.

PALDROCK (A.). Zur Chemie des Lepraerregers. 4. Mitteilung. [**Chemistry of the Lepra Bacillus.**]—*Dermat. Woch.* 1927. Feb. 26. Vol. 84. No. 9. pp. 289–292.

This paper deals with the chemical reaction of the various acid-fast bacilli cultivated by a number of workers from leprosy cases, including those of CLEGG, ELLY, BARRY, NABARRO-BAYON, BRINKENHOFF and of CURI and REENSTIERNA, and also with lepra nodules containing undoubted lepra bacilli. He argues that as the reactions were the same with both classes of material, his results support the view that these various bacilli are true lepra organisms, especially as those of tubercle bacilli show some differences. Methylene blue, methylene green and violet blue stains were used after the organisms had been treated with various chemicals, including normal saline, 3 per cent. sodium acetate for 24 hours, 25 per cent. hydrochloric acid, and 24 hours in 10 per cent. nitric acid, producing varying degrees of hydrolysis. To remove the lipoids three days in ether renewed daily, to remove the lipo-proteids two days in 10 per cent. nitric acid and alcohol were used, and after every process the staining reaction of both classes of material remained the same, indicating similarity of chemical composition.

L. R.

PALDROCK (A.). Das mikrochemische Verhalten der Lepraerreger und der Tuberkelbazillen. [**The Micro-chemical Behaviour of the Leprosy and Tubercle Bacilli.**]—*Dermat. Woch.* 1927. Apr. 9. Vol. 84. No. 15. pp. 487–491.

In this paper the chemical reactions of tubercle and lepra bacilli are compared, with the conclusion that both contain nucleo-, karyo-, lipo- and plasteo-proteids, together with free nucleic acid and lipase. Plasteo-proteid is more firmly combined to lepra than to tubercle bacilli. The chemical difference accounts for the different actions of the same drugs on the organisms of the two diseases.

L. R.

PARÁS (Ernesto M.). **Blood-Chemistry Studies in Leprosy. II. The Alkali Reserve.**—*Philippine Jl. Sci.* 1927. June. Vol. 33. No. 2. pp. 155–167. [12 refs.]

These observations were undertaken on account of the Culion physicians findings alkaline treatment of benefit in cases of lepra reaction. Van Slyke's method of determining the alkali reserve was used, the carbon dioxide capacity being determined in 12 healthy blood plasmas, and in 110 cases of leprosy with and without lepra reactions. No significant changes were found in uncomplicated cases of leprosy, and most cases during lepra reactions also gave normal results, but the alkali reserve was reduced in cases complicated by nephritis. No relation to the type, progress or treatment of leprosy was found.

L. R.

SOLIS (Filiberto). **A Report of an Unidentified Microorganism isolated from Cases of Acute Vegetative Endocarditis among Lepers in Culion. With Brief Mention of Clinical Aspects.**—*Jl. Philippine Islands Med. Assoc.* 1927. May. Vol. 7. No. 5. pp. 155–159. [2 refs.]

Out of 606 autopsies at Culion in two and a half years, 27 showed acute bacterial lesions of the valves of the heart, the organism found in 17 being *Streptococcus haemolyticus* in 2, *Staphylococcus aureus* in 3, and an unidentified organism in 12. In no case was there any previous infection. Fever, sweating and leucocytosis were present, with nausea or vomiting and prostration, death usually occurring in two or three weeks. A short, plump, non-motile bacillus was found, the cultural characters of which are given in detail. The blood of cases agglutinated this bacillus to 1 in 160, but the blood of other lepers only in a 1 in 10 dilution. It was not pathogenic to any laboratory animal. The organism is considered to belong to the genus *Hemophilus* of the family of Hemophilae of American bacteriologists.

L. R.

ARAUJO (H. C. de Souza). O problema da lepra. Necessidade d'uma co-operação internacional.—*Sciencia Med.* 1927. Mar. 31. Vol. 5. No. 3. pp. 154–158.

CROCCO (G.) & LOTTICO (S.). Due casi di lebbra a forma mutilante.—*Riforma Med.* 1927. May 2. Vol. 43. No. 18. pp. 428–429.

LEGER (Marcel). Remarques sur la lèpre à la Guyane française.—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 311–314.

# CHOLERA.

RUSSELL (A. J. H.) & SUNDARARAJAN (E. R.). **Forecasting of Cholera Epidemics.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 901–932. With 16 graphs. [9 refs.]

This is a statistical paper with tables and numerous graphs apparently founded on recent work by BUNDESEN and HEDRICH on early detection of epidemic trends (*Amer. Jl. Pub. Health.*, 1925, Apr.). Their work refers mainly to scarlet fever, measles and whooping cough and among other conclusions they point out that the current calculations and charting of epidemic indices can be done with very little labour from data furnished weekly in Public Health Reports. Russell and Sundararajan conclude that cholera has a downward trend in some areas in India and an upward trend in others for the period of years examined. The most suitable "standard of comparison" for the current data of cholera deaths is the median values of the corresponding months or weeks of the preceding decade. By means of the epidemic index it is possible to forecast epidemics two to three months ahead of their actual occurrence and epidemic index graphs give a very clear picture of the movements of epidemics. By the use of these graphs watch can be kept for possible outbreaks of cholera and preventive measures can be intensified. [v. this *Bulletin, ante,* p. 41 (ROGERS), Vol. 22, p. 765 (Russell etc.)]

J. H. Tull Walsh.

GRAHAM (J. D.). Etudes sur le choléra et expériences de vaccination anticholérique dans l'Inde Britannique. [**Studies in Cholera and Anti-Cholera Vaccination in India.**]—*Bull. Office Internat. d'Hyg. Publique.* 1927. May. Vol. 19. No. 5. pp. 613–623. [2 refs.]

This is a resumé of work done and reports on various aspects of cholera in India, presented to the "Office International d'Hygiène Publique" by the Sanitary Commissioner with the Government of India. Most of the subjects referred to have already been noticed in this *Bulletin.* Tables are given showing certain results of oral vaccination with bile-vaccine and also with ordinary anti-cholera vaccine by the subcutaneous method. For oral vaccination the figures are not sufficient for certain conclusions. The laboratory results of experiments with bile-vaccine on rabbits are most unsatisfactory. On the other hand the advantages of subcutaneous vaccination, as shown by the statistics given, are very evident.

J. H. T. W.

YUNG TSU (T.). Anscheinende Cholerainfektion durch Krabbengenuss. [**Apparent Cholera Infection by Crabs.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Aug. Vol. 31. No. 8. p. 391.

The author describes a case of a student in Shanghai who was attacked with cholera, after eating five uncooked crabs, with the usual symptoms. In a hanging drop from the stools numerous cholera vibrios were seen. Cholera was prevalent at the time.

J. H. T. W.

SATA (A.). Ein Fall typischer Laboratoriumsinfektion von Cholera asiatica. [**Case of Laboratory Cholera.**]—*Deut. Med. Woch.* 1927. June 17. Vol. 53. No. 25. p. 1052. [2 refs.]

Describes the case of Dr. MATSUSAKI who had been working upon cholera vibrios for some time and was suddenly attacked by typical symptoms of cholera, with distinct " rice-water " stools, and vomiting which lasted three days. On the third day the patient was better and on the way to recovery. He was treated with intravenous injections of saline solution and grape sugar. Digitalin and camphor were also given to support the heart. Cholera vibrios were found in the stools.

J. H. T. W.

CANNON (Alexander). **A New Era in the Treatment of Cholera.**—*Caduceus Jl. Hongkong Univ.* 1927. Mar. Vol. 6. No. 1. pp. 34–43. [5 refs.]

This is a general paper on the history of cholera, its pathology, prevention and treatment. Presumably the title refers to treatment with the " essential oils mixture." The author writes : " There is reason to believe that this treatment saved both Shameen and Canton from a severe epidemic of cholera." [*ante*, pp. 462–463 (BHARATI, CANNON, TOMB)].

J. H. T. W.

SEALY (G. O. F.). **The Essential Oil Treatment of Cholera.** [Correspondence.]—*Brit. Med. Jl.* 1927. May 28. p. 985.

The author writes to question the matter of priority for the essential oils in the treatment of cholera. He claims that he described the method for the first time in a paper published June 10th, 1922 [no reference]. He admits, what is well known, that the formula was found on the Government's "Pro-diarrhoea mixture" as supplied from store for the past thirty or forty years. [We do not gather from Dr. TOMB's article (this *Bulletin*, Vol. 20, p. 736) that any claim was made for originality or priority.]

J. H. T. W.

i. TOMB (J. Walker) & THOMPSON (G. W.). **A Critical Enquiry into the Rationale of Intravenous Hypertonic Saline Injections in the Treatment of Cholera.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 516–521. [4 refs.]

ii. ROGERS (Leonard). **A Note on Certain Criticisms of Hypertonic Salines in the Treatment of Cholera.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 522–523. [1 ref.]

i. From ten years' observation of the results of treatment by various methods of thousands of cases of cholera in the coalfields of Bengal and Bihar and Orissa, the writers have been forced to the conclusion, contrary to their previous belief, that the treatment of cholera by intravenous hypertonic saline injections presents, in practice, no superiority over treatment of the disease by ordinary carminative " cholera mixture " containing, as a rule, some preparation of opium—the mortality rate being approximately 50 per cent. in both cases. Hypertonic salines are, moreover, no longer rigidly adhered to ; formulae for hypertonic, isotonic saline and isotonic and hypotonic alkaline salines as used in the Campbell Hospital, Calcutta, are given. ROGERS' practice, founded on reasoning set out in " Cholera and its Treatment "

(1911), is freely criticized and the authors consider, from the examination of chlorides of "seven fatal cases" (average 0·79, *l.c.* p. 148), that, if we take the salt content of the blood as a guide to the salt content of the tissues, then from Table X (*l.c.* p. 143) we find that not only is the percentage of salts in the blood not lowered in cholera but—as might be expected from the loss of so much hypotonic fluid—that it is increased (0·92 the average of 5 cases, not requiring transfusion, as compared with a normal of 0·8 per cent.). They further deny that hypertonic saline checks flux from the bowel and maintains the blood pressure unless repeated injections of this or isotonic saline are given; and state that hypertonic salines possess no specific action in cholera being purely symptomatic to replace, as frequently as may be necessary the fluid lost from the bowel. They refer to figures given by ROGERS ("Bowel Diseases in the Tropics" 1921) showing that the mortality in 589 cases treated by potassium permanganate pills was lower than that of 294 cases treated by hypertonic salines. The teaching of ROGERS that opium is contraindicated in the early stages of cholera is considered to be harmful and erroneous, particularly where paraphernalia for saline injections are not available.

ii. Sir Leonard Rogers considers the attack made upon the facts supporting his theories to be based on a fallacious comparison since it contrasts a mortality of 32·6 per cent. which occurred under hypertonic salines before the method was fully worked out and in a very serious class of cases, admitted to the Calcutta Medical College Hospital, with that in the villages of the coal fields and, in the cases of permanganate data, in Bombay villages. Most village outbreaks contain more mild cases than does a hospital series. *The true comparison is between the same class of cases in the same hospital before and after the introduction of the hypertonic salines*, as given in the following table:—

| Period. | Treatment. | Cases. | Deaths. | Mortality (per cent.) |
|---|---|---|---|---|
| 1895–1905 | Rectal and subcutaneous salines ... ... ... | 1,243 | 783 | 59·0 |
| 1908–1909 | Hypertonic intravenous salines ... ... ... | 294 | 96 | 32·6 |
| 1910–1914 | Hypertonic plus permanganates ... ... ... ... | 858 | 122 | 25·9 |
| 1915–1919 | Hypertonic plus permanganates plus alkalies ... ... | 1,429 | 298 | 20·8 |

| | |
|---|---|
| Reduction of mortality by hypertonic salines alone ... ... | 45 per cent. |
| Reduction of mortality by hypertonic salines *plus* permanganates | 56 per cent. |
| Reduction of mortality by hypertonic salines *plus* permanganates *plus* alkalies ... ... ... ... ... ... ... | 65 per cent. |

The efficiency of saline injections has been confirmed by extensive experience in the Campbell Hospital, in China and elsewhere. He has always recognized that to produce the best results these cases require skilled and constant attendance possible only in hospital; but this does not alter the value of the full treatment under proper conditions. [v. this *Bulletin*, Vol. 24, p. 461 (BERCOVITZ); p. 462 (LIEO); Vol. 23, p. 613 (YUI); also index of previous vols. for numerous references.]

J. H. T. W.

GOUBIN (V.). Sur les formes microbiennes spirillaires du sol par rapport à l'épidémiologie du cholera. [**Soil Spirilla and the Epidemiology of Cholera.**]—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 1. French summary p. 134. In Russian pp. 90–95. [8 refs.]

An important point in the epidemiology of cholera is the frequency of occurrence of spirilla in different soils. Eighteen samples of soil were examined by culture on synthetic media and spirilla found in 7 of these. Peptone enrichment methods are not altogether suitable for the study of soil vibrios, as they disappear from the medium. This is the probable explanation of the fact that we know little of the influence of soil upon the development of cholera epidemics.

W. F. Harvey.

MASLENNIKOWA (W. A.). Ueber biologische Eigenschaften der cholera-ähnlichen Vibrionen. [**Biological Characters of the Cholera-like Vibrios.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Apr. 12. Vol. 102. No. 4-5. pp. 148–157. [12 refs.]

Forty-five cultures were studied, 19 of which were water vibrios, 4 phosphorescent water vibrios, 11 inagglutinable vibrios from cholera cases or cholera suspects and 8 true cholera vibrios. The vibrios from cholera or cholera-like cases, which agglutinated to cholera serum, had no haemolytic power, whilst the inagglutinable were haemolytic. Cholera-like vibrios were not agglutinated by cholera serum.

The author divides his cholera-like vibrios into 3 groups called by him, No. 1 paracholera, No. 2 chemically inactive, No. 3 alkali-forming. No transformation of vibrios from the one group to the other was obtained. The first and largest group, which contained both phosphorescent and non-phosphorescent vibrios, was characterized by an indole positive reaction ; fermentation of sugars with acid production ; coagulation of milk ; proteolytic, haemolytic and diastatic action. The second group had none of these reactions The third group again was indole negative, did not coagulate milk and had neither proteolytic, haemolytic or diastatic action, but vibrios of this group actively produced alkali from the beginning in litmus milk and the sugar media.

A study was made of the largest No 1 group for variants : three types of colony were obtained from old cultures ; (1) transparent, moist smooth, and lustrous ; (2) rugose, greyish, more or less opaque, sticky and adherent to the surface of the medium ; (3) moist, lustreless and milk white. The differences in the appearances of these colonies was only evident after about 48 hours or later. They showed some variability in their biochemical reactions—haemolytic, cholera red, sugar fermentation, milk coagulation and proteolytic.

W. F. Harvey.

DERKATSCH (W. S.). Koagulation und Abbau von Eigelb durch Cholera- und choleraähnliche Vibrionen. (Uebersetzt von Dr. med. B. BRECHER). [**Coagulation and Decomposition of Egg-Yolk by Cholera and Cholera-like Vibrios.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. May 12. Vol. 102. No. 6-7. pp. 319–326. With 1 chart in text. [17 refs.]

The medium for this reaction was prepared as follows :—

(1) Make a mixture of 150 cc. egg yolk and 850 cc. distilled water; (2) add normal soda solution until the mixture clears; (3) boil for 30 min. and filter through cotton wool into flasks; (4) sterilize 15 min. at 110 C. Its pH was 7·8.

Five groups of vibrios are described among the 45 cholera and 18 cholera-like strains studied.

1. *Cholera vibrios.* There is firm clotting of the egg yolk substrate in 42 to 72 hrs. Liquefaction occurs in 5 to 7 days, by which time the production of ammonia is evident. The amino-acid content of cultures may be higher, whilst the protease action is weaker in this group than in groups 2 and 3.
2. *Paracholera vibrios.* The clotting is less marked, but the hydrolytic decomposition of the medium is more pronounced than among cholera vibrios. Some strains produce a brownish colouration of the medium, like the cholera vibrios
3. *Putrefactive vibrios.* Rapid coagulation occurs and equally rapid decomposition of the egg yolk substrate. There is milk-white colouration of the medium; ammonia is produced in 24 hrs. and sulphuretted hydrogen after 5 to 7 days. Great increase of amino-acids takes place in the culture.
4. *V. metschnikovi* is in a group by itself. It shows no coagulation, but there is slight increase of amino-acids in the culture and change of reaction.
5. *Alkali forming vibrios.* No coagulation. After 5 to 7 days slight diminution of the amino-acid content. No change of reaction.

The clotting of yolk of egg is a permanent and constant character of cholera vibrios, independent of their source, age and number of passages on ordinary media. It is not corellated with power to coagulate milk.

W. F. Harvey.

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DAVID (Hans). Ueber eine durch choleraähnliche Vibrionen hervorgerufene Fischseuche. [**A Fish Epidemic due to a Cholera-like Vibrio.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Mar. 8. Vol. 102. No. 1-3. pp. 46–60. With 1 text fig. [16 refs.]

An epidemiological and bacteriological account is given of an organism capable of infecting carp and other fish; it belongs to the class of cholera-like vibrios. When first isolated it has the form of a short bacillus, sometimes slightly curved, becoming more truly vibrio-like with subculture. This vibrio grows best at room temperature and is not pathogenic for warm blooded animals, but kills certain fish and frogs. It is named *V. piscium.* Besides its relationship to the epidemic in fish, which is fully substantiated, the author treats at some length of its place among cholera-like vibrios. A high titre cholera serum agglutinates this organism in high degree, although not quite to the end titre of the serum used. Absorption and complement fixation tests, with antisera to *V. cholerae* and *V. piscium* respectively, suffice to separate the two and to show that *V. piscium* has no antigenic properties in regard to the true cholera vibrio.

A discussion of the possibility of transformation of the true cholera vibrio into an inagglutinable, saprophytic water type of vibrio occupies the final portion of the paper, which concludes with the observation that *V. cholerae* and *V. el tor,* cultivated at room temperature and administered in large dose to carp and frogs, kills these in 4–8 days with symptoms similar to those elicited by infection with *V. piscium.* Is it possible that cholera vibrios may undergo more rapidly in cold-blooded animals changes in the direction of transformation into water vibrios?

W. F. Harvey.

GOUBINE (V. M.). [Sur la réaction nitreuse du vibrion cholérique (en russe).] **[Nitrite Production by the Cholera Vibrio.]**—*Ann. Stat. Bacter. Agron.* 1926. No. 24. pp. 213–217. [Summarized in *Bull. Inst. Pasteur.* 1927. Apr. 15. Vol. 25. No. 7. p. 306.]

The article is one of a series of three in the same journal which deal with the production of nitrites from organic matter and ammonia by bacteria other than the genus *Nitrosomonas*. The formation of nitrites by *V. cholerae* is the basis of the cholera red reaction and Goubine finds that this reaction is not explainable by a reduction of nitrites. He has been able to demonstrate the production of nitrites by *V. cholerae* in a synthetic medium of calcium acetate to which is added glycocoll, asparagin, or ammonia. This production is of only minute but measurable quantities. [*v.* this *Bulletin*, Vol. 21, p. 888 (HIRSCH)].

W. F. Harvey.

SEN (Ajit Kumar). **Diagnosis of Cholera from Cellular Exudate. A Short Note.**—*Calcutta Med. Jl.* 1927. Mar. Vol. 21. No. 9. pp. 448–450. [2 refs.]

This paper supports work previously recorded by MAITRA, GANGULI and BASU—this *Bulletin*, Vol. 23, p. 187.

J. H. T. W.

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MASHIMO (Shinichiro). [On the Mechanism of the Infection by Cholera Vibrios in the Animal Body. Experiments on Intestinal Infection. Communication II.]—*Kei-O Igaku* (*Jl. Kei-o Med. Soc.*) 1926. Aug. Vol. 6. No. 8. [Summarized in *Japan Med. World.* 1927. Mar. 15. Vol. 7. No. 3. p. 80.]

OGILVIE (W. H.). Cholera in the Army in India Nearly Fifty Years Ago.—*Jl. Roy. Army Med. Corps.* 1927. July. Vol. 49. No. 1. pp. 63–65.

PALMER (F. J.). The Causal Organism of Cholera.—*Indian Med. Gaz.* 1927. Apr. Vol. 62. No. 4. pp. 204–208.

ROBERTSON (R. C.) & ANNING (C. C. P.). The Cholera Epidemic of 1926 in Shanghai with Reference to the Clinical Treatment of 368 Cases.—*Jl. Roy. Army Med. Corps.* 1927. May. Vol. 48. No. 5. pp. 321–330. With 3 text figs. [3 refs.]

# PLAGUE.

CUMPSTON (J. H. L.) & MCCALLUM (F.). **The History of Plague in Australia 1900-1925.**—*Commonwealth of Australia. Dept. of Health. Service Publication No. 32.*—238 pp. With 12 figs. (7 maps). 1926. Melbourne.

The history of plague in Australia during the quarter of a century from 1900 to 1925, as set forth in this report, reads like a familiar narrative, partly no doubt because it recalls the pioneer work of Ashburton THOMPSON and TIDSWELL, and partly because plague here has run a "normal" course, in the sense that it has not exhibited any striking peculiarity from an epidemiological point of view. The first case was recognized in January 1900 in Sydney, 6 years after plague was officially declared to be epidemic in Hong Kong, the starting point of the present pandemic. Since the port of Sydney is in frequent communication with infected places in China and India this interval may seem a long one. Actually, the first appearance of plague in Australia coincided with a time of rapid and world-wide dispersion of the disease. The infection in rodents and man persisted during the next 10 years, and this period was followed by a plague-free interval, also of 10 years, from 1910 to 1920. In 1921-1922 fresh outbreaks occurred in a number of ports on the Eastern coast of the country.

During the first decade there were 1,212 cases in the whole of Australia, New South Wales heading the list with 614 cases. The recurring outbreaks in Sydney, the capital of this State, furnished material for the admirable papers of THOMPSON. Charts reproduced in the volume under review demonstrate the close association of the epizootic and the epidemic in this city; rat plague invariably preceded plague in man. March, April and May were the months of greatest prevalence, and also the months when rat-fleas were most numerous. In August 1921 a death from plague in Brisbane was the signal for a recrudescence, with an extension to the ports in Queensland, and to Sydney in New South Wales. There were 58 cases in Brisbane, 33 in Townsville, 18 in Cairns, and 35 in Sydney. During the whole history of plague in Australia there has been little tendency for the disease to spread inland, and the series of outbreaks in 1921-1922 was strictly confined to the coast line. Infection spread from port to port along sea or water routes; rats trapped or found dead in a number of ships proved to be infected.

*R. rattus*, *R. norvegicus* and *Mus musculus* were the species of rodents which were plague-infected in the town and city outbreaks. The authors give tables from which it seems that the ratio of *R. rattus* to *R. norvegicus* captured on Australian and overseas vessels at Sydney and Melbourne in 1921-1922 was 40 : 1 (5,045 rats examined).

New South Wales and Queensland were the worst infected States from 1900 to 1909, and the rats there had a high infestation with *X. cheopis*, whereas those in Victoria, which was only slightly affected, had a minimal *cheopis* infestation. Tasmania has remained quite free from plague, and it is significant that *X. cheopis* has not been found there; in Hobart all the fleas found on rats have proved to be *C. fasciatus* [see p. 197, but also the table on p. 106, which gives *Ctenopsylla musculi* as the common rat-flea of Tasmania]. *X. cheopis*, *Ctenopsylla musculi* and *Ceratophyllus fasciatus* were the most important species found on rats examined at Sydney in 1921-1922; they were present in the ratio roughly of 12 : 7 : 5 in the order named; and they infested *R. rattus* and *R. norvegicus* to nearly the same extent.

An important feature of plague in Australia is the relative or absolute immunity of certain localities. Thus Newcastle, a seaport only 70 miles by sea from Sydney, with an immense volume of inward and outward shipping, escaped infection during 8 years out of 10, and when infected had only 14 cases. As already stated there has been little tendency for places inland to be attacked. Victoria, with Melbourne as its chief city, and South Australia with Adelaide, were only lightly invaded. The absolute immunity of Tasmania is partly explained by the absence of *X. cheopis*, but it would seem that specific observations on the problem of local immunity in Australia have not been made; at least the reviewer cannot find any explanatory comments on the subject in this report.

Attention has recently been drawn to the risk of the dissemination of plague in the periodical swarms of mice across the countryside, especially since the association of man and mice during these swarms has been proved by the occasional transference of the fungoid disease of mice to man. However, the mouse is not regarded as an efficient carrier of plague, and its flea infestation is so slight as to be almost negligible. The question may be asked whether there is any danger of plague spreading to the rabbit population of Australia; the point is not mentioned in this report.

The resolutions of the "Commonwealth and States of Australia" Conference on Plague, which was held at Sydney in 1921, are included in an appendix, and are worth consulting as a collective expression of well-considered opinions on preventive measures against plague. Not the least important of these conclusions has reference to the fostering of an enlightened and active public opinion on the parts played by rats and rat-fleas in the spread of plague.

Another appendix relates to epidemiological records of plague outbreaks. The authors state that during the plague years in Australia much matter of importance either has not been recorded or has been lost. They have therefore drawn up a schedule which may serve as a guide for recording essential data. Every plague worker who has spent time searching for information in the archives of a plague-infected country will applaud the principle of encouraging a uniform record scheme with due provision for the free expression of individual opinions.

Another appendix consists of a comprehensive bibliography of plague in Australia.

The authors of this report might with advantage have added contributions on the laboratory findings and clinical experience of plague in Australia by colleagues with special knowledge of these aspects of the subject. A curative serum has been in some degree effective in the treatment of plague in Australia: a reasoned analysis of its mode of action and the results obtained would have been instructive. Incidentally the statement in the Introduction that HAFFKINE in Bombay developed antiplague serum should be amended when opportunity offers.

G. F. Petrie.

HIRST (L. Fabian). **Researches on the Parasitology of Plague. Part 2.** —*Ceylon Jl. Sci.* (Sect. D. Med. Sci.). 1927. May 16. Vol. 1. Pt. 5. pp. 277–455. With 1 text fig. 4 charts & 5 maps. [City Microbiol. Lab., Colombo.]

Those who find interest in exploring the outlying and unsettled territories of research into plague will discover much to stimulate reflection in Part ii of Dr. Hirst's volume on the Parasitology of plague. The author discusses his own experiences in relation to those of other workers, and in so doing gives evidence of a wide and critical acquaintance with recent work on plague. The range of his enquiry is so extensive that abstraction is not easy, but the following notes will, it is hoped, give some idea of the topics surveyed.

*X. cheopis.*—The ancestral home of this species is probably the Nile valley, a view supported by the fact that *R. rattus* in Upper Egypt has a virtually pure infestation with this flea. *R. rattus* appears to be the definitive host of *X. cheopis* as *R. norvegicus* is that of *C. fasciatus*. The former species is widely distributed on rats, especially *R. rattus*, in localities between the 35° of latitude north and south of the equator. The incidence of bubonic plague is, in general terms, greatest where the climatic conditions or other circumstances favour the breeding and activity of *X. cheopis*. The author has not been able to trace a single instance of bubonic plague becoming endemic among the rats in any locality in the absence of *X. cheopis*, and he regards this species as the chief vector of plague between the house rats and between them and man. There is strong evidence that the severity of plague in a particular place is largely governed by the magnitude of the *cheopis* population, as, for example, in Colombo and in India. Dr. Hirst has drawn up an interesting table (Table XXXV) which shows a high degree of correlation between the *cheopis* flea-index on rats and the mean plague mortality *per mille* for a number of towns and cities in India.

*X. astia.*—This is characteristically a Southern Asiatic species. Two years before plague broke out in Colombo the author collected about 400 rat-fleas during the plague season in the centre of the area where *X. cheopis* is now the most prevalent flea. All these fleas were identified by ROTHSCHILD as *X. astia.* Rat plague first appeared in February 1914, and in the following month 16 out of 199 fleas from the same area were found to be *X. cheopis* ; this species has since been the predominating one in the plague area of Colombo. In 1913 the author discovered that the rat-fleas in Madras—a city notable for its immunity from plague—were purely *X. astia*, and in consequence of these observations he originated the theory that local prevalence of *X. astia* on rats and local immunity to plague are co-related. In Dr. Hirst's view the distribution of *X. astia* and *X. cheopis* in India is not, as opponents of the theory contend, attributable to climatic factors, but is readily explicable on zoo-geographical lines. The optimal conditions for the activity of *X. astia* are not precisely known, but this flea is probably adapted to a more restricted range of temperature than *X. cheopis*, extending a little higher but not nearly so low, and it is less adapted to drought than *X. cheopis*. There is evidence that plague infection produces a more rapidly fatal effect on blocked *X. astia* than on blocked *X. cheopis*, and this circumstance is probably the most important cause of the relative inefficiency of *X. astia* as a transmitter of plague under tropical conditions. Work on the subject is being pursued at the present time in India ; eventually, no doubt, the factors involved in the " astia " problem will be unravelled.

*X. brasiliensis.*—The original home of this species is probably Central Africa. It is well established on rodents throughout Peninsular India. There is no detailed information regarding its bionomics, its ability to convey plague experimentally, and its relation to human plague.

*C. fasciatus.*—The author thinks that this species is probably an inefficient carrier of plague both from rats to man and from rat to rat.

In the view of CRAGG and Hirst the results of laboratory experiments on flea transmission should be cautiously applied to field conditions. They point out as a possible analogy that *Anopheles rossii* is an effective experimental transmitter of *Plasmodium vivax* and is yet an ineffective transmitter in nature.

When plague broke out in Colombo there was a greater proportion of " septicaemic " than of bubonic cases, the former term being used in the sense that the patient died of plague before the appearance of discoverable enlargement of lymphatic glands. The blood of these cases *post mortem* contained numerous virulent plague bacilli. In later years the type of the disease has gradually changed so that now the septicaemic cases are in the minority. In Colombo it has occasionally happened that patients developing septicaemic plague have been hurried out of the city. Dr. Hirst agrees with the workers in India that in such an event the chief risk is the lighting up of an epizootic focus in the new place of abode by infected rat-fleas transported on the patient's body or in his personal effects, but he thinks also that if the new habitation should be very rat-infested, wandering *X. cheopis* may become primarily infected by feeding on such a septicaemic patient and so initiate an outbreak of rat-plague. In the author's view this possibility, though of little practical importance, should not be altogether disregarded.

The last section of the report deals with the subject of plague prevention. In Colombo special attention is naturally paid to the *cheopis* areas as delimited by flea surveys, and the result has been that during 1926 there were only 13 human plague cases and only 8 discovered cases of rat-plague. There is a constant danger of re-importing the infection from Rangoon, which is becoming the principal focus of plague infection among the ports of the East. In Colombo the association between imported grain and plague is particularly clear, and indeed in this city grain is the chief vehicle of infection. The greatest danger probably arises from the importation of grain and gunny bags that are heavily infested with the eggs and larvae of *X. cheopis* owing to storage in rat-infested warehouses at the place of export. If the distance between the ports of despatch and receipt is comparatively short an effective interchange of flea species by this means may occur, but over long sea journeys colonies of ship rats are the carriers and distributing agents. The final sentence of the volume summarizes the author's views on the prevention of plague and at the same time expresses in a condensed form the whole subject matter of his studies and researches. It reads as follows—"The prevention of the spread of plague is a problem in applied biology depending for its solution on an exact and comprehensive study of local conditions and a catholic understanding of the intricate and ever varying relationships between the virus of the disease, the cold-blooded arthropod vector, and its warm-blooded mammalian host."

G. F. Petrie.

GOYLE (Amar Nath). **On the Transmission of Plague by** *Xenopsylla astia* **and** *X. cheopis.* **Preliminary Observations.**—*Indian Med. Gaz.* 1927. June. Vol. 62. No. 6. pp. 317-318. [7 refs.]

Of the three species of Xenopsylla found on Indian rats *X. brasiliensis* has a limited distribution ; *X. cheopis* and *X. astia* are extremely common. The evidence at present available with regard to the relationship of the incidence of plague to the distribution of the different species is extremely conflicting. It was considered by the U. P. Government that this important question demanded renewed enquiry and Dr. Goyle was deputed to undertake the investigation. The methods of experiment were essentially similar to those used by the Indian Plague Commission (1906), HIRST (1923) and TAYLOR and CHITRÉ (1923). As it is important to identify the fleas in the living state the method devised by TAYLOR and CHITRÉ was used. A series of plague transmission experiments were carried out with rats from Madras and the U.P. during the months of November and December, 1926, at Lucknow. The results of two series showed some difference. Out of seven experiments with Madras rats in which *X. astia* was used successful transmission occurred in three ; under similar conditions, three out of seven experiments with *X. cheopis* were successful. In the eighth experiment the rat inoculated in the *cheopis* cage did not die of plague, but there was successful transmission with *astia*. With the Jhansi rats the results so far obtained show that *X. cheopis* is a much more efficient vector than *X. astia* ; in a series of twelve experiments there has been successful transmission in nine with *cheopis* and only three with *astia*. In two experiments with guineapigs *cheopis* has carried plague in both, *astia* once only. [cf. this *Bulletin*, Vol. 24, p. 453 and above (HIRST)].

J. H. Tull Walsh.

GUERRINI (Guido). Topi, pulci e peste in Giappone. [**Rats, Fleas and Plague in Japan.**]—*Giorn. d. Reale Soc. Ital. d'Igiene.* 1927. Vol. 44. No. 1. 8 pp.

This paper is largely statistical. Nearly half a million rats were examined during the 18 months February, 1909–July, 1910. Among this number, 0·1 per cent. of the ***norvegicus*** species were found infected with plague, but 1·55 per cent. of ***alexandrinus***. In Tokio and Aichi the latter species was positive in 90·48 and 86·9 per cent. respectively, but in Prefecture of Miye *R. **rattus*** was positive in 53·68 per cent., *R. **norvegicus*** in 24·23, and *R. **alexandrinus*** in 22·09 per cent.

As regards the fleas, *Ceratophyllus **anisus*** and *C. fasciatus* were widespread; *Paradoxospyllus curvispinosus*, a species peculiar to Japan, was very frequently met with, especially in Tokio; *Xenopsylla cheopis* only rarely, in sea-ports; *Ctenopsylla cuniculi* common everywhere in the country. In Yokohama, among 2,508 fleas there were 2,276, or 90·7 per cent. *C. anisus* and *P. curvispinosus*, and only 9 of *X. cheopis* and *Pulex irritans* together. Except *X. cheopis* all are most numerous in winter; they increase gradually from September to January, rapidly in January and February, and decrease rapidly in May.

From examination of fleas caught in Yura all the species were shown to be carriers of plague, except *Ceratophyllus felis*.

H. Harold Scott.

NIKANOROW (S. M.). Der gesunde Mensch als Träger der Pestbazillen und seine epidemiologische Rolle. [**Healthy Man as Carrier of Plague Bacilli.**]—*Seuchenbekämpfung.* 1927. Vol. 4. No. 3. pp. 140–145. [16 refs.] [State Microb. & Epid. Inst. for S.E. of U.S.S.R.]

The author remarks quite rightly that it is not always possible to discover the source of an outbreak of plague and he then puts the question: where has the plague virus been maintained in the interval? That it is revived often from an epizootic among rodents is undeniable. The old belief that plague was contracted from clothes, etc., is now seldom held. And now the theory is held that man may be a carrier of plague and the cause of an epidemic. The author notes several references to cases in which the infection might possibly have been due to such a source. He quotes a case which came under his own observation where a relation was supposed to have brought plague infection into a Kirgiz family. Three cases of bubonic plague occurred; all died. The relative "S.J." was isolated and disinfected. After six days, under observation, he returned to his own family. Seven days later his wife was attacked with plague. S.J. was again isolated and all his belongings were disinfected. Twelve days later—November 28th, 1923—he went to stay with relatives and again plague appeared. So it would appear that S.J. had infected three families. Thus S.J. was marked as a healthy carrier. Fluid was taken, on December 20th, from some slightly enlarged axillary and inguinal glands and injected into a guineapig, which died of plague. During the whole period S.J. showed no signs of illness. This matter therefore requires careful study. [*ante*, p. 34 (LEGER)].

J. H. T. W.

DURAND (Paul) & CONSEIL (Ernest). Très longue persistance ganglionnaire du bacille de la peste chez l'homme après guérison. [**Persistence of *B. pestis* in Glands after Recovery.**]—*Arch. Inst. Pasteur de Tunis.* 1927. Apr. Vol. 16. No. 1. pp. 92–98. [8 refs.]

The authors describe two cases of plague which recovered but still retained plague bacilli in glands near the original buboes 12 months and 2 months after the date of recovery. Positive results were not obtained either under the microscope or by culture from material taken by simple puncture; but, from portions of glands removed, cultures were obtained. The authors emphasize the danger of such carriers.

J. H. T. W.

GIRARD (G.). Epidémiologie de la peste pulmonaire à Madagascar [**Pneumonic Plague in Madagascar.**]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 233-251. [3 refs.]

Primary pulmonary plague directly contagious from man to man has been observed in Emyrne for the past five years. The infection is conveyed by bacilli in the expectorated sputum. The author states that although the lungs may contain *B. pestis* contagion is unlikely when there is no expectoration. The increase of virulence of the infection after passage explains the rapid spread of an epidemic and the shortening of the incubation period and the rapid mortality.

J. H. T. W.

APERS (E.). & VAN BOECKEL (L.). De l'importance et des difficultés du diagnostic différentiel entre la peste bubonique fruste ou ambulatoire et la lymphogranulomatose inguinale subaigue ou bubon climatérique. [**Differential Diagnosis of Abortive or Ambulatory Plague and Lymphogranuloma or Climatic Bubo.**]—*Bull. Office Internat. d'Hyg. Publique.* 1927. Feb. Vol. 19. No. 2. pp. 184–199. [83 refs.]

This question of the difficulties and importance of diagnosis between possible plague buboes and enlarged inguinal glands due to other causes is discussed at great length and examples are given. These cannot be given in full. A very full list of authors consulted is to be found at the end of this paper. [v. this *Bulletin*, Vol. 20, p. 743 (TANON & CAMBESSÉDÈS)].

J. H. T. W.

CAZENEUVE (H. J.). Les foyers endémiques de la peste en Transbaïkalie et les épidémies de peste pneumonique en Mandchourie. [**The Endemic Foci of Plague in Transbaikal and Epidemics of Pneumonic Plague in Manchuria.**]—*Rev. d'Hyg. et de Méd. Préventive.* 1927. Mar. Vol. 49. No. 3. pp. 161–176. With 2 text figs. & 2 maps. [9 refs.]

This is an interesting and concise compilation. It will be useful to those who have not read the numerous papers on plague in Transbaikalia and Manchuria which have been noticed in previous volumes of this *Bulletin*.

J. H. T. W.

BOSTON (H. Merrick). **Two Cases of Bubonic Plague.**—*Lancet.* 1927. Apr. 23. pp. 870–871.

Owing to the comparative rarity of plague in this country these two cases are of interest :—

A boy, aged 10, was admitted to the David Lewis Hospital, Liverpool, August 28th, 1926, with fever and some delirium. In the left groin there were enlarged glands, painful on palpation. Temperature 106° F. ; pulse 36 (*sic*) and respiration 36. Widal reaction was negative for the typhoid group. Blood and fluid were put into culture media but were sterile. The boy died on August 30th. A mass of haemorrhagic glands removed from the left groin gave smears containing a bacillus suggestive of *B. pestis*. A guineapig and a rat were inoculated and within 24 hours were fatally affected ; they died in 48 hours and cultures from them showed *B. pestis*. The father of the boy, aged 60, came to the hospital on August 30th in connexion with the death of his son. He looked ill and complained of pains and headache with nausea. He had a small swelling in the right groin, not painful. His temperature was 98·6° F. and varied between that and 97° F. while in hospital. Pulse 120 and respiration 28. The gland was removed and was found to contain pus. Bacteriological examination showed *B. pestis*. The man recovered and no further cases were seen. The father worked in an office on the grain wharf and there were rats in his office and it is suggested that the infection came from a grain ship.

J. H. T. W.

i. NIKANOROFF (S. M.). Novi Endemicheski Ochag Chumi v Predjelach S.S.S.R. [**A New Plague Focus in the U.S.S.R.**]—*Vjestnik Microbiologii & Epidemiologii.* Saratov. 1927. Vol. 6. No. 1. pp. 3–8. (French summary p. 125). With 1 map in text. [2 refs.]

ii. IGNATIEV (A.). Busachinskaya Vspishka. [**The Plague Outbreak at Buzashi.**]—*Ibid.* No. 2. pp. 160–163. (English summary pp. 258–259). [2 refs.]

i. A new plague focus has lately been detected in the Mangishlakski steppes of Transcaspia, a vast territory inhabited by nomadic Kirghese. Two outbreaks were observed there in 1926. The first, taking place in the summer and early autumn, was responsible for 41 fatal cases ; all with exception of the first victim (who had an axillary bubo and secondary pneumonia) suffered from primary pneumonic plague. An expedition under Nikanoroff's leadership arriving after the epidemic confirmed the diagnosis through autopsies on the first and two other victims, and recorded that the outbreak was traceable to an epizootic among gerbilles (*Rhombomys opimus* Licht.). A few animals with manifest plague were found. A guineapig injected with an emulsion prepared from the spleen of 22 apparently healthy rodents, succumbed to plague ; the same result was obtained with a guineapig which had been injected twice with a large number of parasites (fleas and ticks) found on the rodents and specially in the burrows.

Nikanoroff suspects that infected rodents had been imported into this area from Turkestan (v. this *Bulletin*, Vol. 23, p. 179, GREKOFF) through caravans.

ii. Ignatiev furnishes details regarding the second outbreak occurring further westwards near the Buzashi peninsula in October-December, 1926, when 16 bubonic cases (6 with secondary pneumonia) and 8 pneumonic ones occurred with 20 deaths. The author states that of these cases 17 were traceable to the epizootic among the gerbilles, one had evidently been caused by contact with plague-infected hares (? *Lepus timidus*), while 6 apparently arose from the killing and dissecting of diseased camels.

Both outbreaks were cut short because the neighbours of the affected families soon realized the infectious character of the malady and kept away.

Wu Lien-Teh & R. P.

NIKANOROV (S.) & KNIZAEVSKY (A.). *Rhombomys opimus* Licht.—porteurs de peste dans le Turkestan et dans la région Trancaspienne. [*Rhombomys opimus* **Carrier of Plague in Turkestan and the Transcaspian Region.**]—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 2. French summary pp. 256–258. [1 ref.] [In Russian pp. 154–159. With 4 text figs. 2 refs.] [Microb. & Epid. Inst., Saratov.]

The investigations recorded were carried out by an expedition from the " Microbiology and Epidemiology Institute, Saratov " in 1924 and confirmed in 1926. In Turkestan deaths among *Rh. opimus* coincided with the outbreak of epidemic plague. Two gerbilles captured alive died in 8–10 hours and showed signs of plague. *B. pestis* was cultivated from them. Again in 1926 gerbilles were found containing many plague bacilli. A description of *Rh. opimus* is given, with figures, in the Russian text. The ectoparasites of these gerbilles, identified at the Institute were :—

*Ctenophthalmus dolichus, Ophthalmopsylla volgensis, Rhadinopsylla cedestis, Ceratophyllus*—group *laeviceps* ; *Xenopsylla*—group *conformis, Coptopsylla*—near to *lamellifer* and *Neopsylla*—near to *setosa*.

A few observations made with living fleas showed that *C. laeviceps* would bite the guineapig, white rat, mouse and spermophile.

J. H. T. W.

KONOVALOVA (S.). **Fleas, the Inhabitants of the Spermophile Burrow—the Carriers and Preservers of Plague Infection.**—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 1. English summary p. 128. [In Russian pp. 39–40.]

Working with a Research Anti-plague Detachment around the village of Zavetnoë the author examined 17 spermophile burrows for infected fleas during May, 1926. From burrow No. 7 43 fleas were taken and a culture of *B. pestis* was obtained. A spermophile inoculated with the emulsion from these fleas died within 7 days.

J. H. T. W.

TIKHOMIROW (J. J.). Sur les liens épidémiologiques des épidémies pesteuses d'hiver dans les Steppes Kirguisiennes avec les épizooties pesteuses des souris. (D'après les études épidémiologiques pendant l'épidémie pesteuse dans le gouvernement d'Oural en 1913 et dans la contrée Sékréta en 1905). [**Relation of Winter Plague to Epizootics in Rodents.**]—*Arch. Sci. Biol.* 1926. Vol. 26. No. 1–3. French summary p. 201. [In Russian pp. 95–102.]

The results of these investigations contain nothing very new ; but one section from the summary is worth quoting : If a considerable epizootic is present among mice and other rodents and if the conditions of food and life become unfavourable these animals migrate to new areas; during this migration they will infect the rodents of those localities in which they rest or remain [cf. this *Bulletin*, Vol. 22, p. 771 (PATERSON)].

J. H. T. W.

GOLOV (D. A.) & JOFF (I. G.). Blochi Suslikov kak Chraniteli Chumnoi Infekzii v Zimnem Periode. **[The Suslik Fleas as Reservoirs of Plague Infection during Winter.]**—*Vjestnik Microbiologii & Epidemiologii.* Saratov. 1926. Vol. 5. No. 4. pp. 239–248. French summary pp. 329–331. [1 ref.]

The authors, experimenting with *Ceratophyllus tesquorum*, *Neopsylla setosa* and *Ctenophthalmus agyrtes*, are satisfied that the sisel (suslik) fleas kept in test-tubes at temperatures corresponding to those prevailing in the burrows at wintertime, remain alive and active for months. Likewise, they could demonstrate experimentally that the fleas were able to feed upon hibernating susliks (and even upon corpses soon after death). Similar observations were also made under natural conditions. Fleas starved in empty burrows were found to survive up to 10 months; their survival in burrows left by the hosts is suggested also by a few observations made when digging deserted burrows in the fields. (This is of special importance, as the susliks usually die of plague above ground, whereas a good number of the fleas remain constantly in the holes.) Further experiments show that suslik fleas may survive for months at low temperatures (min. —25·2° C.), provided the atmosphere is sufficiently moist.

Plague infected fleas which were afterwards kept starving in test-tubes survived up to 206 days; all fleas tested yielded at death living and virulent plague bacilli.

This stimulating paper shows that the suslik fleas play perhaps no little role in the carrying over of the infection. When we consider that the virus is preserved in the rodents themselves for long periods (see Nikanoroff, this *Bulletin*, Vol. 23, p. 184, and Gaiski, *ibidem*, Vol. 24, p. 32), it may be seen that conditions are rather favourable for a perpetuation of the disease and that there is no need to assume a periodical reinfection of the susliks.

WU LIEN-TEH & R. P.

i. TRAUT (I. I.). **Report on the Activity of the Gas Expedition in the Year 1925.** Edited by the Laboratory for Research upon Poisonous Substances of the Commissariate for Agriculture, Saratov, 1926. In Russian. 108 pp.

ii. ——. **Note on the Methods of Poisoning Ground Squirrels (Susliks) in the Endemic Plague Regions.** Leningrad, 1927. In Russian with English summary. 15 pp.

iii. ——. **Report of the Gas Expedition on the Fight with Susliks in the Endemic Plague Regions in the Year 1926.** Leningrad, 1927. In Russian with English summary. 21 pp.

In South-East Russia, as in other plague areas, the campaign against wild rodents, at first undertaken by the medical authorities, is now entrusted to agricultural experts. Traut reports extensively upon this new activity.

Considerable progress has been made since a rational fight against the susliks was started in 1924 (see this *Bulletin*, Vol. 23, pp. 617, 618–19). Though attempts to destroy the rodents with chloropicrine gave encouraging results, this substance does not seem to have been widely used, the work being conducted as heretofore with carbon bisulphide and chlorine. Much attention was paid to the question how far all these methods could kill the parasites as well as the rodents in the burrows. Traut concludes that, though the parasites may survive in burrows containing fresh nests, they will not become dangerous for a further spread of the disease if such burrows are plugged up after the treatment.

Still more instructive than this and other modifications of the technique is the enlarged scope of the work. Formerly it was restricted to the creation of rodent-free belts round settlements threatened by epizootics. Now attention is paid also to localities away from the villages where the population is likely to come into contact with the susliks. In addition to this palliative work wholesale destruction is carried out in suitable regions. In 1926 nearly 150,000 acres with 4,929,893 holes were so treated at a cost of over 65,000 roubles (£7,000). The immediate results, as manifested by the absence of human plague, appear to have been excellent, while the number of susliks surviving in the districts treated, though varying to some degree, was generally very low.

It remains to be seen how far the few surviving rodents may multiply and thus infest the areas again. Also it must be noticed that the funds granted for the work were not regularly forthcoming and practically never sufficient to do all that was planned. Lack of co-operation from the population was another factor contributing to the difficulties of the campaigns. Appreciation is the more deserving for what has been accomplished.

Wu Lien-Teh & R. P.

BURGESS (A. S.). **The Selection of a Strain of** *Bacillus pestis* **for the Preparation of Vaccine, with Special Reference to the Effect of Animal Passage on Virulence.**—*Jl. of Hyg.* 1927. July. Vol. 26. No. 2. pp. 152–162. [6 refs.] [Med. Research Inst., Accra.]

Recent work on the immunizing value of different strains of the same organism has shown the necessity of attention to the antigenic characters of those used in the preparation of vaccines. It is this point which is dealt with in this paper. The common domestic rat of Accra, *Cricetomys gambianus*, which is very susceptible to inoculation with plague, was used in the experiments. In the opinion of the author virulence of the strain used is of prime importance for the preparation of a satisfactory vaccine. Infrequent subculture of strains kept at room temperature afforded no evidence of loss of virulence, but a marked fall of virulence occurred with passage through vaccinated animals, that is to say through animals possessing well marked but incomplete immunity. Moreover the virulence thus lost was not restored by passage of the strain through non-immune rats and it seems evident from the facts that the procedure had given rise to a stable, avirulent, rough strain of the organism. Again it is probable that this passage of a virulent strain through naturally immune rats, which may have been included among those used in experiments, accounts for the finding that the *B. pestis* lost virulence in the course of passage through rats, and possibly is one of the factors accounting for subsidence of an epidemic in nature.

Since vaccinated, as well as non-vaccinated animals, died after infective inoculation, certain conditions were laid down for the estimation and record of degrees of protection afforded, degree of virulence of culture and degree of susceptibility of an animal and this was based on the time elapsing between infection and death. A time interval of

408 hours, was allotted for recovery and " was obtained by adding 48 hours, as a margin, to the longest survival period (360 hours) obtained out of all the animals infected (351), excluding those which recovered." The difference between the survival period of each animal and the average survival period of the controls (48 hours) was first determined and the efficiency of a vaccine expressed as the ratio of the average difference to 360. The author finds that, whereas vaccine prepared from virulent strain gives considerable protection against infection with virulent strain, it does not protect at all against avirulent strain. He also finds that vaccine prepared from avirulent strain gives little or no protection against infection with virulent strain although animals recovering from infection with an avirulent strain are immune to subsequent infection with virulent strain.

W. F. Harvey.

NAIDU (B. P. B.) & SHAMSHER JANG. **A Note on the Nutrient Broth now used for the Culture of** *Bacillus pestis* **and its Hydrogen-Ion Concentration.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 135–139. With 1 chart. [10 refs.] [Haffkine Inst., Parel, Bombay.]

Haffkine's plague prophylactic is essentially a culture of plague bacilli grown in a liquid medium for six weeks at room temperature, sterilized by heat at 60° C. for 15 minutes and carbolized to contain 0·5 per cent. of phenol. Owing to the prejudice of the people of India against the use of commercial peptone, Warden's peptone, prepared from goats' flesh, came into use towards the end of 1898. This was prepared by heating finely minced goats' flesh (1 kilo) with hydrochloric acid (150 cc.) in water (2 litres) at three atmospheres pressure for six hours. The filtered solution being acid was neutralized with caustic soda, resulting in the formation of some 80 gm. of common salt. To bring the salt content to 0·5 to 0·75 per cent. the fluid was made up to from 12 to 16 litres with water. This medium was much diluted, had a dark brown colour and was variable in composition. GIBSON attempted to clear the medium with charcoal. In 1904 GIBSON made further modifications and the improved medium was used by BANNERMAN for the manufacture of anti-plague vaccine in 1905 and continues in use :— Goats' flesh freed from fat is minced. To every kilo of flesh 90 cc. hydrochloric acid are added ; the jar is then placed in a hot-water-tub and kept at 70° C. for three days ; 60 to 80 cc. of a 40 per cent. caustic soda solution are added. The peptone is then sterilized by steam for one hour at 100° C. at ordinary atmospheric pressure. It is filtered and to every litre of filtrate two litres of boiling water are added. This is again filtered into one litre flasks, plugged with cotton-wool and placed in a steam sterilizer for one hour and is then ready as a culture medium. The best results are obtained with a broth of the initial pH 6·8.

J. H. T. W.

HIMMELFARB (J. K.). Zur Differentialdiagnose zwischen dem *Bac. pestis* und dem *Bac. pseudotuberculosis rodentium* auf Kohlehydratnährboden. [**Differentiation of** *B. pestis* **and** *B. pseudotuberculosis rodentium* **on Carbohydrate Media.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. July 1. Vol. 103. No. 1-3. pp. 39–41. [State Bact. Inst., Odessa.]

**HIMMELFARB** (J. K.). Zur Frage der Differenzialdiagnose zwischen dem *Bac. pestis* und dem *Bac. pseudotuberculosis rodentium* auf Kohlenhydratnährboden.—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 1. German summary p. 135. [In Russian pp. 82–85.]

The degree to which glucose is fermented has been used by OTTEN for the separation of these two organisms. In this study maltose peptone water, of pH7.0–7·2 and in concentrations of 1, 0·5, 0·25, 0·1, and 0·05 per cent., has been used for the same purpose. This medium, tubed in quantities of 1 cc., should be sown with 1 cc. of a suspension of the test organism, containing 50 to 75 million bacteria : it is tested for its reaction by the addition of 2 drops of 0·5 per cent. alcoholic methyl red solution after 24, 48 and 72 hours. incubation at 28–30° C. The quantitative relationship between medium, concentration of maltose and initial quantity of the test bacterium should be exact, if the reaction is to succeed. A yellow colouration, indicative of the alkaline modification of the indicator is characteristic, within the limits given, of *B. pestis* whereas *B. pseudotuberculosis rodentium* produces no modification of the red colour of the indicator.

W. F. Harvey.

**MORALES VILLAZÓN** (Néstor). La virulencia del bacilo pestoso en medios con y sin Cloruro de sodio. [**Virulence of *B. pestis* in Media with and without Chloride of Sodium.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1926. Mar. Vol. 4. No. 4. pp. 385–392.

As the result of numerous inoculations into animals in the laboratory the author finds that :—

1. Cultures in media deprived of chloride of sodium are less abundant than on ordinary agar media.
2. There is no fundamental difference in virulence of the bacillus in the one or the other medium.

J. H. T. W.

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**EVTIKHIEV** (A.). Organisation antipesteuse actuelle, ancienne et future de la Sibérie.—*Rev. Microbiol. et Épidémiol.* 1927. Vol. 6. No. 2. French summary p. 261. [In Russian pp. 176–181.]

**GAÏSKY** (N. A.). La peste chez les spermophiles hibernants (*Spermophilus mugosaricus*).—*Arch. Sci. Biol.* 1926. Vol. 26. No. 1–3. French summary p. 202. [In Russian, pp. 115–121. 4 refs.] [*ante*, p. 33.]

**HICKS** (E. P.). The Relation of Rat-Fleas to Plague in Shanghai.—*Jl. of Hyg.* 1927. July. Vol. 26. No. 2. pp. 163–169. With 1 chart in text. [11 refs.]

**IGNATIEV** (A.). Plague Outbreak at Buzachin.—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 2. English summary pp. 258–259. [In Russian pp. 160–163. 2 refs.]

**RANGEL** (Doutorando Mario). Em torno de dois casos de peste.—*Rev. Med.-Cirurg. do Brasil.* 1927. Feb. Vol. 35. No. 2. pp. 37–42.

**RENZO** (Alberto). Sobre dois casos de peste.—*Brasil-Medico.* 1927. Mar. 12. Vol. 41. No. 11. pp. 223–226.

**ROHARDT** (Wilh.). Beiträge zur Klinik der Pest.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Apr. Vol. 31. No. 4. pp. 166–179. [1 ref.]

**SUKNEFF** (W. W.). Kurzer Ueberblick ueber die Epidemiologie der Pest während der letzten 8 Jahre im transbaikalischen endemischen Pestherd.—*Cent. f. Bakt.* I. Abt. Orig. 1927. May 12. Vol. 102. No. 6-7. pp. 338–347. With 3 text figs. [26 refs.]

**TCHOURILINA** (A. A.). Recherches épidémiologiques sun la peste.—*Arch. Sci. Biol.* 1926. Vol. 26. No. 1–3. French summary p. 200. [In Russian pp. 71–93. With 1 map.]

# REVIEWS AND NOTICES.

Buxton (Patrick A.) [M.R.C.S., D.T.M.& H. Director, Dept. of Medical Entomology; London School of Hygiene & Tropical Medicine.] Assisted by Hopkins (G. H. E.) [M.A., F.E.S.] **Researches in Polynesia and Melanesia. An Account of Investigations in Samoa, Tonga, the Ellice Group, and the New Hebrides, in 1924, 1925. Parts I-IV (Relating principally to Medical Entomology).**—No. 1 of the *Memoir Series of the London School of Hygiene & Tropical Medicine.*—pp. xi+260. With 43 text figs. & 12 plates. 1927. July. London : School of Hygiene & Tropical Medicine. [10s. 6d.]

The book is an account of investigations principally relating to entomology in Samoa, Tonga, the Ellice Group, and the New Hebrides during 1924 and 1925. The joint authors are to be congratulated on the production of an interesting and attractive work which at the same time provides a study of the entomology of the Islands of the South West Pacific, and a critical examination of many of the puzzling factors governing mosquito development and bionomics.

Part I deals with the geography and a description of the Islands ; Part II, with the climate, solar radiation, rainfall, atmospheric temperature and humidity, winds and evaporation, and with the readings of the katathermometer.

Part III presents an account of the Myriapoda, Arachnida (Acarina) and Insecta. The centipede *Scolopendra subspinipes*, Leach, is common in Samoa, and the authors describe the effects of its bites on human beings—from minor to fairly severe symptoms being set up. Of the *Arachnida*, 5 species of ticks are recorded, 2 species of mites from rats, and from clinical observations *Sarcoptes scabiei*, var. *hominis*, Hering, is thought to be common in Samoa. Two scorpions, *Isometrus maculatus*, Gerv., and *Harmurus australasiae* (Fabr.) were found fairly frequently in many of the islands, but the effect of the sting of either is said to be very slight.

Under the section devoted to the Insecta, genera and species of a large number of separate Orders are recorded, the most interesting from the medical aspect naturally being the *Siphonaptera* and the *Culicidae*. The human flea, *Pulex irritans*, Linn., is said to have been introduced to the Pacific Islands probably by Europeans, and it is not a very common species. *Xenopsylla cheopis*, Roths., the rat flea, was found to have a low average density on the rats captured in Samoa—less than 2·5 flea per positive rat. *Ctenocephalus felis*, Bouché, the only other flea recorded by the authors, is said to be often found on cats and dogs.

From pp. 66 to 124 the Culicidae of these islands receive attention. One Anopheline, *Anopheles* (*Myzomyia*) *punctulatus*, Dönitz (syn. *A.* (*Nyssorhynchus*) *annulipes*, var. *moluccensis*, Swell.), and sixteen Culicine species are recorded and in part described, the observed geographical distribution also being mentioned. Excellent text figures are provided illustrating the taxonomic characters of many of the larvae.

The remainder of Part III includes a section entitled " General Notes on Culicidae " in which several interesting aspects of mosquito ecology, bionomics and control are discussed, and Part III ends with a key for the identification of some of the larvae, pupae, and adults.

Part IV, Sections I–V, " Experiments Performed on *Aëdes variegatus* and *Aëdes argenteus* " with Appendicies I–IV, constitute to the scientific investigator perhaps the most interesting part of the book.

Section I. " A Study of the Factors which control Egg-laying in *Aëdes* " describes the experiments undertaken by the authors to analyse the preference which the female Aëdes shows when she is seeking a site on which to lay her eggs. Methods for the exact control of such experiments are given, and the authors record experiments with organic infusions, such as grass and bran, starches, bacteria, etc. The influence of light and darkness, rain, wind, the nature of the surface of the landing-place, the size of the water-containing vessel, water-vapour, temperature, the presence of salt and chemical compounds, the hydrogen-ion concentration, etc., are all factors which are carefully studied.

Section II. " A Study of the Factor which causes the eggs of *Aëdes* to Hatch." Observations are here recorded on the methods employed in the experiments, the normal behaviour, the effect of drying, heating, submerging, stranding, floating, and agitating, the influence of distilled water, salt and organic solutions, including lysol.

Section III. " Experiments with larvae and pupae of *Aëdes variegatus* and *Aëdes argenteus*." The observations deal with the normal mortality, the length of the larval and pupal stages, the relation to temperature, food supply, chemotropisms, salinity, and light and darkness. Experiments on the effect of starvation, poisons, and survival after partial drying are included.

Section IV. " A Short Note on Adults " deals with the proportion of the two sexes. The authors' figures indicate that the sexes hatch from the eggs in approximately equal numbers—an observation which tallies with the records of most other workers.

Section V. " Summary. *Aëdes* and its Environment." As the title of this section indicates, the authors discuss the inferences to be drawn from the previously described experiments. Appendix I. " A Comparison of Certain Elements at the Observatory and the Hospital, Apia " gives further statistical data to observations mentioned in the earlier part of the book. Appendix II. " Malaria and Filariasis in the New Hebrides." Buxton believes that malaria occurs on all the inhabited islands, except Futuna. Filariasis is fairly common, and is of the nocturnal type. Since *Culex fatigans* has only recently been imported to Vila, the authors exonerate it as the vector, and suggest that *Anopheles punctulatus* may very well serve as the intermediate host.

Appendix III. " Is there a General Factor tending to cause the Eggs of *Aëdes variegatus* in different experimental pots to hatch on certain days ? " by J. F. C. HASLAM. The author of this appendix, after describing 29 experiments undertaken in connexion with the investigation, concludes : " it is apparent that no support for the postulation of such a factor can be derived from the material under study." Appendix IV. " Distribution of Hatching Times of *Aëdes variegatus*," by M. GREENWOOD and E. M. NEWBOLD, furnishes a statistical and mathematical study. The authors state : " There is no apparent consistent correlation between the hatching rate on any day, and the proportion of eggs hatched on previous days. Only two out of the nine experiments suggest a positive association."

The book concludes with a bibliography of four pages and a good index.

Buxton and Hopkins have not actually brought to light any of the elusive factors governing the development and bionomics of mosquitoes, but they have well illuminated the region in which these factors lie hidden, and in consequence future workers should to some extent find the search less arduous.

M. E. MacGregor.

COVELL (G.) [M.D., Major I.M.S.]. **A Critical Review of the Data Recorded regarding the Transmission of Malaria by the Different Species of Anopheles; with Notes on Distribution, Habits and Breeding-Places.**—*Indian Med. Res. Memoirs.* Supplementary Series to *Indian Jl. Med. Res.* 1927. July. Memoir No. 7. 117 pp. [329 refs.] [Central Malaria Bureau, Kasauli.]

Imagination falters in the attempt to realize the amount of patient and discriminative work that this unpretentious but invaluable compilation represents. What the author has done is to collate and summarize the results recorded up to the present day, of the manifold investigations carried on in all quarters of the globe on the subject of the transmission of malaria by specific anopheline mosquitoes ; and he gives us here the result of his own labours, in the very convenient form of a list of Anopheles species, arranged in alphabetic order, where exact particulars of distribution, breeding-places, and habits are given (so far as the record goes) for each species, while, as regards those species whose reaction to the malaria parasite has been ascertained by observation, particulars are given, for each such species, of the name and venue of every observer and of the details of his series of observations in nature and in the laboratory.

In his introduction the author emphasizes the commonsense proposition [applicable not only to Anopheles, but to all species of arthropods similarly pathogenous], that in estimating the adequacy of a species as an actual transmitter of parasites to man, it is not quite sufficient to discover that the parasites can develop in that species—it must be ascertained that they can complete their development there ; equally essential to a correct estimate is the knowledge whether or not the given species is both common and generally abundant, and whether or not it habitually haunts houses (or regularly visits them from the jungle) in order to attack mankind. Another point emphasized by the author is that, where in one particular place a species has been proved by conclusive observations to be a natural transmitter, the knowledge must not be applied, unhesitatingly, beyond its venue, since a given species may be a natural transmitter in one part of its range and not in another ; of which phenomenon several instances are given.

The 31 species herein following are those that have been proved by actual observation to be susceptible to malaria parasites. In each case the author gives, so far as the records carry him, the observer's name, date, and country of observation, the number of insects examined and the number (and percentage) found infected, the organ infected (gut or stomach or both), and in the case of experimental observations, the species of parasite employed.

1. Species found infected both in nature and experimentally *Anopheles aconitus, barbirostris, bifurcatus, crucians, culicifacies, fuliginosus, funestus, hyrcanus* (=*sinensis*), *karwari, kochii, leucosphyrus, ludlowii, maculatus, maculipennis, minimus, punctipennis, quadrimaculatus, stephensii, subpictus* (=*rossii*) with some qualifications to be noted, *superpictus* (=*palestinensis* of Theobald), *tarsimaculatus, tessellatus, umbrosus,* and *vagus.*

2. Species found infected only in nature : *A. albitarsis, argyrotarsis, gambiae* (=*costalis* of many writers), and *listonii.*

3. Species experimentally infected only : *A. albimanus, plumbeus,* and *willmorii.*

The names of species are mainly those authorized by Christophers in his *Provisional List and Catalogue of the Anophelini.*

A. Alcock.

Cochrane (Robert G.). [M.B., Ch.B., M.R.C.P. (London), D.T.M.& H., Medical Adviser, Mission to Lepers.] **Leprosy in India. A Survey.**—22 pp. With 1 map. 1927. London : World Dominion Press, 1, Tudor Street, E.C.4. [2s.]

This comprehensive survey reviews the provision for the treatment of lepers in the separate provinces of India. The numbers disclosed by the census of 1921 should be multiplied eight to ten times to give a proper realization of the true incidence of the disease. The belief that humidity of climate plays some part in the prevalence of leprosy is confirmed by the high figures from such districts as the Malabar coast and Burma compared with those from Rajputana. The hill districts are probably most leprous on account of the uncleanly habits of the hill-people and owing to their customary crowding into small ill-ventilated dwellings. Concerning the different provinces, leper work in Bengal is inadequate. While Bihar and Orissa are better provided than most provinces, the need of a medical centre for instruction—at Purulia for instance—is noted. The leper incidence in Punjab, excluding the hill districts, is very low. The home at Tarn Taran, near the sacred town of Amritsar, has gained a local reputation among the lepers. In the hill districts geographical and racial difference make institutional treatment difficult, also the fact that these areas are divided into numerous small native states whose inhabitants are primitive and ignorant. Prejudice in such districts might be overcome by travelling dispensaries. In Bombay the home at Nasik, one of the most sacred towns of India, attracts many lepers. It is suggested that the home at Miraj might well be used for teaching purposes. The leprosy service in this province to be efficient requires centres situated so as to cater for the most leprous areas, particularly to the east of the Ghats. With regard to Travancore with its high leprosy incidence (0·5 per mille) " little is being done really to meet the situation." In Hyderabad there is only one home, a model of its kind, with the best facilities for treating early cases and for instruction. In Assam " the actual situation with regard to the disease is imperfectly known and needs further survey." Burma is heavily infected, especially on the moist west coast. The four existing institutions are to date mostly concerned with the old advanced cases, while " they could be centres for the starting of an efficient anti-leprosy organization."

The medical report of the Mission to Lepers and the proposals of the British Empire Leprosy Relief Association are quoted. The policy approved by the Mission to Lepers requires in each province ; (1) an institution in which early cases will be adequately treated ; (2) adequate supervision of the smaller homes ; (3) opportunity for the training for leper work. In the organization of an efficient service on such lines this brief survey should prove of useful value. A blank map is appended depicting each province with its respective leper stations charted and showing also its individual incidence of disease.

W. Jenkins Oliver.

JAN. 1928

BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

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## SLEEPING SICKNESS.

LEAGUE OF NATIONS. Health Organisation. **Interim Report of the League of Nations International Commission on Human Trypanosomiasis.**—147 pp. With 29 figs., 2 maps & 12 plates. C.H.536. 1927. Mar. Geneva.

### 1. General review of the activities of the Commission (H. L. DUKE). pp. 7–15.

The Commission, which consists of Dr. H. L. DUKE, British Delegate and Chairman, Dr. VAN HOOF, Belgian Delegate, Dr. G. LAVIER, French Delegate, Prof. KLEINE, German Delegate, Dr. PRATES, Portuguese Delegate, and Mr. PLEVIN, Laboratory Assistant, commenced work about the beginning of 1926, and established its headquarters in the Entebbe laboratory. The first few weeks were spent in drawing up a programme of work. The programme is divided into two parts, Epidemiological Studies and Laboratory Work and consisted of the following sections :—

*Laboratory Experiments.*

" 1. Continue examination of Damba and mainland-shore fly ; also shore-line flies near the Laboratory as control.

" 2. Collect a number of strains of human trypanosomes from different *palpalis* and game-tsetse areas. Compare these strains carefully as regards morphology, transmissibilty, virulence, etc. Search for posterior-nuclear forms in human strains from *G. palpalis* areas.

" 3. Introduce virulent, typical *T. gambiense* into ruminants to ascertain if posterior-nuclear forms develop. Careful study of the behaviour of the trypanosomes in domestic ruminants and, if possible, in wild animals.

" 4. When a virulent strain of trypanosomes is transmitted cyclically by tsetse, is the virulence in any way modified by the transmission ? This bears upon ' introduction of strain ' into new area.

" 5. Infect an animal with two strains of trypanosomes, one virulent, the other mild, and see which strain, if either, is transmitted cyclically.

" 6. Repeat experiments on ' sur-infection ' in susceptible animals to ascertain the effect on the host of repeated doses of : (1) homologous ; (2) heterologous strains.

" 7. Endeavour to impair the resistance of animals, such as baboons, mangabeys, etc., to trypanosomes against which the animals possess a partial or complete natural immunity. Poor food, ankylostomes, Indian ink and histamine may prove a means to this end.

" 8. Attempt infection of baboons, etc., with a mixture of *T. brucei*, *T. rhodesiense* and *T. gambiense*.

" 9. Infect *G. palpalis* with *T. rhodesiense* and, if possible, test on man.

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" 10. Culture experiments with all strains.

" 11. Test effect of Bayer 205 (in doses) on the transmissibility of trypanosomes by tsetse.

" 12. Transmissiblity of relapse strains from natives treated by Bayer 205.

" 13. Viability in human blood, immune and non-immune, of gland trypanosomes of tsetse (Rodhain's tube).

" 14. Does *T. gambiense* transmitted by *G. morsitans* alter at all? Appearance of posterior-nuclear forms, etc.

" 15. All strains isolated from man to be inoculated into guinea-pigs to compare the reaction of these strains in animals.

" 16. Transmission of arsenic-fast strains by tsetse.

" 17. Precipitin test or some equivalent examination."

*Epidemiological Studies.*

" 1. Acquisition of evidence bearing on the empirical and practical assumption that, in *palpalis* areas at any rate, man is by far the most important, if not the only, reservoir of human trypanosomes.

" 2. Investigation of the 'survival foci of infection,' from which the human trypanosomes of *palpalis* areas spread when the necessary favourable conditions arise: fly density, female percentage, breadth of contact in such foci; cyclical infectivity of fly; part played by animals in maintenance of infection. Special attention in examination of 'auto-recovery' or 'cure' resulting from treatment to see if the cerebro-spinal fluid affords evidence of continued though suspended infection.

" 3. Careful search, in the Budama area, for evidence of alternative vector, such as *Glossinae* (other than *G. palpalis*) mosquitoes, *Haematopota*, tabanids, or other biters, intramural or extramural. Possibility of direct passage from man to man during any of the ordinary activities of daily life, i.e., coitus, native ceremonial (scarification, etc). Evidence of seasonal variations in spread of infection from man to man, with reference to seasonal prevalence of vector.

" 4. Careful study of history of each case discovered and record of severity of symptoms; condition of cerebro-spinal fluid; movements leading up to present residence and occupation; personal knowledge of the disease, past and present; probable date of onset of symptoms, and how the disease progressed and developed; subjective symptoms.

" 5. Special endeavour to determine lines of movement of population impinging on infected areas, whether empty or occupied, and search for factors which instigate and direct such movements.

" 6. Careful epidemiological survey of Majanji, Busoga coast and Mpologoma infected areas; mapping out of all cases of trypanosomiasis in the populations recently surveyed by the I.C. Eastern Province.

" 7. Survey of inhabited fly areas with a view to ascertaining 'limits of safety' for a community in contact with tsetse species.

" 8. Search for evidence that man can be infected by cyclically infected bush-fly in either *palpalis* or game-tsetse areas.

" 9. Continuation of the 'block system' and 'fisherman experiment' as an undertaking of high scientific value with a direct bearing on the problem of survival and spread of human trypanosomiasis.

" 10. Effect of drugs.

" 11. The above programme applies more especially to investigations in *palpalis* areas."

The rest of the report consists of the following seven papers:—

## 2. **Report on my visit to the Kavirondo Coast** (F. K. KLEINE). pp. 17–22.

The object of this journey was to visit a chronic focus of sleeping sickness caused by *T. gambiense* with a view to ascertaining whether there were any indications of immunity amongst the natives and also whether, and to what extent, the biology of the *T. gambiense* strains in that district differed from the biology of the *T. gambiense* strains in Tanganyika. It was found that at the present time there is no epidemic of sleeping sickness on the southern shore of the Gulf of Kavirondo, and Kleine believes that this is due to the small percentage of infected flies and not to the immunity of the population. Attention is drawn to the fact that, so far as is known, the only morphological difference between *T. gambiense* and *T. rhodesiense* is that the former shows no posterior-nuclear forms in the blood of guineapigs and rats. With a view to testing the reliability of this criterion, 16 different strains of human trypanosomes were injected into 21 guineapigs; in only 4 of the strains was a positive result obtained. The blood of the infected guineapigs was subjected to a prolonged search, and after a time " many very fine posterior-nuclear forms " were found. These forms were first found in the guineapigs (2nd passage) infected from a young native in the initial stage of the disease, who had only left Homa Point to go and buy food at Kisumu. He had never been into *G. morsitans* or *G. swynnertoni* areas, but had always lived on the shore of Lake Victoria.

The posterior-nuclear forms were also found in trypanosomes originating from another native in the second stage of the disease, who had never left his native peninsula.

### 3. Experiments on the cyclical transmission by *Glossina palpalis* of arsenic-fast strains of polymorphic trypanosomes (H. L. Duke). pp. 23–33.

The trypanosome used in this work was isolated in February, 1924 [not September, 1925, as misprinted in the Report] from a situtunga antelope shot on Damba Island. At the time of its recovery from the antelope its general reactions resembled those of *T. brucei.* This strain possessed the advantage of being easily demonstrable in the peripheral blood of monkeys, so that the effects of the arsenic could be easily observed. The drug used was atoxyl.

The technique followed in this enquiry consisted in applying boxes of clean laboratory-bred *G. palpalis* to monkeys carrying the arsenic-fast trypanosomes. After one or two feeds on the infecting animal, the flies were starved for 24 hours, and then fed every other day on fowls for some thirty days, and finally on clean monkeys until the expiration of the experiment. When the clean monkeys became infected they were tested with appropriate doses of atoxyl to see how the cyclically transmitted trypanosome responded to the drug. These experiments were carried on for some seven months to the third generation and were then terminated owing to pressure of other work. Details of the work are set forth in four tables. The first deals with the original monkeys subjected to treatment with atoxyl in order to produce the arsenic-resistant strains. The second deals with the monkeys infected by the first series of fly experiments fed on, and infected by, two of the animals mentioned in the first table. The third gives the histories of the monkeys of the second and third series of fly experiments; these monkeys represent second and third generations of transmissions. The fourth shows the details of the actual fly experiments.

Unfortunately, owing to the shortness of monkeys, no control inoculations were made to ascertain the susceptibility to arsenic possessed by the trypanosome at the time the experiments were commenced, but Professor KLEINE, who treated the first three monkeys used in the experiment, concluded that the *dosis efficax* for the strain in question was about 0·01 gm. of atoxyl per kilogram of body weight; and it was upon this basis that Duke continued the treatment. It is seen from the table that the behaviour of the trypanosomes under gradually increasing doses of atoxyl was consistent with the assumption that the parasites were becoming increasingly arsenic-fast.

After completing a series of transmission experiments, under the impression that the *dosis efficax* for the strain was about 0·01 gm. per kilogram, before assembling the material for publication Duke decided to carry out some control inoculations of atoxyl into untreated monkeys. The results were unexpected, as in three monkeys three times the *dosis efficax* failed to sterilize the animals: all relapsed as did also two other animals treated respectively with the *dosis efficax* and twice this amount, even though treatment was given on the first day after parasites appeared in the blood.

After considering various possible explanations of this, the author reaches the following conclusions:—

1. That, even if the direct-transmission series of the Damba trypanosome gradually developed during the last 5 or 6 passages an increased resistance to atoxyl, the estimated *dosis efficax* at the 30th passage still caused complete disappearance of trypanosomes from the peripheral blood for at least 10 days.

2. That, at the time of their selection for treatment, the first 3 monkeys which resisted three times the *dosis efficax* were all in a fairly advanced stage of the disease and showed signs of involvement of the nervous system.

3. That, judging by the results of the examination of the cerebro-spinal fluid, the virulence of the Damba trypanosome for monkeys had increased between the 20th and the 26th to 28th passages.

Returning to the actual fly-transmission experiments two very important facts emerge. Firstly, in the majority of the monkeys of the 1st, 2nd and 3rd generation of fly transmissions, the administration of the test dose of atoxyl hardly affected the presence of trypanosomes in the peripheral blood; and secondly that the only monkeys used to infect the original series of fly experiments had long been under observation, and their trypanosomes always behave in a manner consistent with the conclusion that neither strain possess any unusual resistance to arsenic prior to the course of treatment with atoxyl.

The conclusions are as follows:—

" 1. That the acquired character of resistance of a trypanosome to arsenic persists after cyclical passage of the strain through tsetse.

" 2. That the degree of arsenic resistance possessed by a strain is not diminished by cylical passage of the strain through *Glossinae*.

" 3. That the character survives, at any rate, to the third generation of cyclical passages.

" The importance of these results is obvious when we remember the wide use of atoxyl as a prophylactic in human trypanosomiasis and, also, the significant fact that a strain resistant to atoxyl may also possess resistance to other drugs, such as antimony, etc.

" It is thus imperative to repeat these experiments with *T. gambiense* freshly isolated from men, and this will be done as soon as opportunity allows."

**[The problem which Duke has set himself to solve appears to the reviewer to be one of fundamental importance. Without in any way**

venturing to criticize the work, which is obviously of extraordinary difficulty, the reviewer feels compelled to confess that a very careful and critical examination of the tables in which the data are summarized has left him still in some doubt whether the experimental results are sufficiently clear to enable him to accept, without any reasonable doubt, the fundamental conclusion that the acquired character of arsenic resistance persisted after the cyclical passage of the trypanosome through tsetse. Doubtless, Dr. Duke is continuing his investigations on this very important and difficult question. Possibly, the investigation of the transmission of other acquired characters, such as the artificial virulence to rats or mice of trypanosomes like *T. gambiense* or *T. congolense*, which have been maintained by direct passage through these animals, might prove profitable ; or the possibility of transmitting through Glossina the character of exalted virulence of *T. vivax* for rabbits induced artificially by the method described by the reviewer and BLACKLOCK many years ago. Difficult as this problem is, it is to be hoped it will shortly be solved beyond any doubt, as the question is one of far-reaching importance.]

### 4. **Experiments on the value of "Bayer 205" as a prophylactic against trypanosomes developing in** *Glossina palpalis* (H. L. DUKE). pp. 35–39.

The experiments described in this paper were devised to ascertain whether the presence of " Bayer 205 " in the blood imbibed by tsetse has any inhibitory effect on the development of trypanosomes taken up by the fly subsequent to the meal of " Bayer " containing blood.

The conclusions are as follow :—

" 1. The imbibition* by flies of the blood of an animal, from 48 to 408 hours after it had been treated with Bayer 205, does not inhibit the cyclical development in the fly of trypanosomes taken up by the insect 24 hours after its feed on the ' Bayer ' treated animal.

" 2. A dose of 0·023 gramme Bayer 205 per kilogram body weight in a monkey protects the animal against infection by cyclically infected flies for a period of not more than two months."

### 5. **Epidemiological enquiry into Sleeping-Sickness in the Budama District and the Kavirondo Country** (L. VAN HOOF). pp. 41–103.

The author's investigations were limited to the Budama and neighbouring districts, north of Lake Victoria, which are recognized as endemic areas for *T. gambiense* and *Glossina palpalis*. The principal questions investigated were the nature of the reservoir of the virus, the methods by which the trypanosome is transmitted, and all the geographical, biological, economic and other conditions which might contribute to the spread of the disease or to its maintenance in an endemic form. Enquiry is not yet at an end and the present report is necessarily of a preliminary nature.

The following summary and conclusions are given :—

" The epidemiological enquiry covered the districts of Budama and the neighbouring infected areas of Bugweri, Busoga, and Kavirondo, and involved the examination of more than 45,000 natives. At the same time, it has only dealt with one special aspect of the question—its aspect in the zone investigated—and it is only by comparison with endemic or epidemic areas that have *G. palpalis* and *G. morsitans* in varying biological conditions that we can generalise and establish the rules which govern the continuance of an endemic or the expansion of an epidemic. I do not in any case consider that my enquiry is complete, and I hope to make another visit when I can perfect my existing information, particularly as to the subsequent history of the cases diagnosed and treated, and the biological conditions of the country when climatic conditions are different.

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* Inhibition is the word printed.

" The following conclusions therefore apply only to the limited field of my observations, and at the same time constitute a programme for further research in other endemic areas.

" 1. There is nothing to suggest that there is any other reservoir of virus than man.

" 2. The continuance of the endemic is closely bound up with the existence of glossinae. The ratio between the sexes of the flies, and their number, seem to have less importance in connection with the continuance of the endemic than other factors, such as the occupations of the natives. The limit of security for the natives cannot be calculated on the basis of figures representing a minimum of contact between man and fly ; it consists in complete separation of these hosts from the trypanosome. Although there is no conclusive evidence, it seems more probable that the trypanosome is transmitted by glossinae infected cyclically than that it is transmitted mechanically, for, in the latter case, we should expect at least limited epidemic foci to be formed.

" 3. It has been found that the degree of gravity in cases of trypanosomiasis varies very considerably. The most serious cases have developed rapidly and could not be arrested ; specific treatment proved useless. Less serious cases have been cured by very small doses of specific remedies ; one of them, indeed, is at least stationary without any treatment at all. The examination of the cerebro-spinal fluid is the best criterion, and is indispensable in judging of the treatment required or the degree of cure or improvement obtained. These differences in the gravity of the disease are due to variations in the virulence of the trypanosome, and not to individual characteristics in the patient which could be explained as immunity or tolerance. The latter, if it does exist in a small degree, invariably fails as soon as the virulence of the trypanosome increases.

" 4. There is no reason to suppose that there is any other carrier of the trypanosome than the glossina.

" 5. The history of the disease as well as my detailed observations show that the spread of sleeping-sickness is favoured by all the circumstances—occupation, famine, migration, etc.—which have caused removals of population, and there is reason to believe that the virus becomes weakened in an endemic area if no new elements—trypanosomes, flies, or men—are introduced.

" 6. In judging of the therapeutic value of a treatment, it is essential to ascertain the virulence of the trypanosome, or at least its relative virulence ; the above observations illustrate the immense difference in sensitiveness to arsenical medicaments between two endemic areas, and between different viruses in one area."

### 6. On the practical diagnosis of Sleeping-Sickness (L. VAN HOOF). pp. 105–116.

The author quotes BRODEN'S (1920) conclusions, which are as follows :—

" 1. The easiest and most reliable method of diagnosing sleeping-sickness consists in puncturing the enlarged cervical lymphatic glands and immediately making a microscopic examination of the lymph ; this method yielded positive results in 87·7 per cent. of cases.

" 2. The examination of 10 c.c. of centrifuged blood is an excellent method of diagnosis ; it is essential in all cases where hypertrophy of the glands has not yet developed or has already disappeared ; we had to use it because gland examination was inadequate in 7·7 per cent. of our cases.

" 3. Spinal puncture is of less use in diagnosis proper ; it enabled us to detect trypanosomiasis in 4·5 per cent. of cases ; it is necessary when we wish to ascertain the stage of infection and to institute a judicious treatment."

BRODEN obtained 61·3 per cent. of positive results by examination of fresh coverslip preparations of blood in a small batch of favourable cases, but RODHAIN (1923) obtained only 40 per cent. of positive results by this method for endemic areas in the Belgian Congo, and 50 per cent. of positive results by the examination of stained thick drop preparations. Examination of the centrifuged blood gave, according to BRODEN, 80·7 per cent. of positive results. Van Hoof writes that diagnosis by simple palpation of the enlarged glands is a method for which there is some excuse when carried out in a hostile country on insubordinate natives, but elsewhere it has been largely criticized, and has given rise to errors that cannot be entirely ignored. In a table the author gives the results of examining 28 cases by the various methods from an endemic zone. Of these cases, 18 were classified as suspect on their clinical symptoms alone, 15 were suspect owing to the size, number, and consistency of the glands, and 15 proved to be positive by the detection of trypanosomes in the lymph. Examination of fresh coverslip preparations gave only two positive results. In thick stained drops trypanosomes were found 8 times. Triple centrifuging of the blood proved by far the most reliable method and was positive in 23 cases. In 24 instances the cytological changes of the cerebro-spinal fluid were significant.

The author compares these results with those obtained by BRODEN and finds that his own observations were made on a much higher proportion of advanced cases. The author's preference is for gland puncture followed, if necessary, by centrifuging of blood.

Cytological deterioration of the cerebro-spinal fluid plays an important part in the diagnosis and prognosis of trypanosomiasis, because we are concerned with endemic infections in which the great majority of cases are chronic. The cellular elements which are abnormal either in number or nature are small lymphocytes, large mononuclears, or medium lymphocytes, muriform cells, eosinophil myelocytes, and sometimes large vacuolated elements which might be taken for macrophages. Trypanosomes appear at times, but their number varies widely, and sometimes it may be impossible to detect them even in very advanced cases. The degree of cytological deterioration depends on two factors, the age of the disease and the virulence of the germ.

Details are given concerning the condition of the spinal fluid in a series of 14 monkeys infected with the trypanosome of the Damba antelope, which entirely confirm the conclusions of BRODEN and the author.

*T. gambiense* in experimental animals produces deteriorations of the spinal fluid which are proportionate to the length of the period of infection and the virulence of the parasite. Illustrations of this are shown in a table from which it will be seen that large mononuclears and muriform cells do not appear unless small lymphocytes are already present in considerable numbers.

The following are the conclusions :—

" 1. In areas with a low degree of endemicity, the diagnosis of sleeping-sickness is rendered more difficult by the frequency of advanced or chronic cases.

" 2. Microscopic examination of the glandular lymph is the first process to apply to every suspect. The most reliable method is triple centrifuging of the blood, which should be used when gland-puncture is negative or cannot be carried out. Any doubt will be removed by analysis of the cerebro-spinal fluid if the first two methods are negative.

" 3. Examination of blood in a thick stained drop is a resource not without value, which may be of service in the case of maniacs and children, or where triple centrifuging of the blood is impossible.

" 4. Even in the absence of trypanosomes, examination with special reference to cytological changes of the cerebro-spinal fluid is the most valuable method of diagnosis, particularly for very advanced cases in which these changes attain a degree and a form not found in other diseases.

" As a ground for prognosis, it is so valuable as to be indispensable at the beginning and end of a well-conducted treatment.

" 5. The degree of change in the cerebro-spinal fluid serves as a measure of the virulence of the trypanosome and the stage reached by the disease."

## 7. **The posterior-nuclear form** (G. LAVIER). pp. 117–142.

After referring briefly to a discovery of the posterior-nuclear form and to the various trypanosomes from which it has been described, the author enquires whether it is really true that no individual of the species *T. gambiense* has ever been found with rearward displacement of the nucleus.

He remarks that in 1910, when STEPHENS and FANTHAM first made their announcement of the posterior-nuclear forms in *T. rhodesiense*, although the morphology of *T. gambiense* had already been extensively studied, nothing had yet occurred to call attention to the posterior-nuclear forms. It is therefore not impossible that observers had already met with a few individuals with a displaced nucleus, but had attached no importance to the phenomenon. When later it was desired to verify the non-existence of such forms recourse was had to strains of *T. gambiense*, which had already been maintained for years in the laboratory. Lavier considers that there is no doubt that if it had been possible to review the old preparations made when the first cases studied, or animals inoculated, reached Europe, posterior-nuclear forms would have been found without difficulty. After searching the literature he considers that two plates at least are worth close examination, and he reproduces figures from each, which show, in his opinion, some evidence of posterior displacement of the nucleus in *T. gambiense*. The first are from a plate made by HINDLE and the second from one made by BRUCE.

Up to the present, 11 strains taken from cases infected in the *G. palpalis* areas near Lake Victoria have been isolated by the Commission and preserved in the Entebbe Laboratory. None of them has yet given a lasting infection to the rat; three of them have also been unable to infect the guineapig. One infected a guineapig, but was unfortunately lost. In all the other 7 strains, however, the author has found posterior-nuclear forms in the guineapig. He emphasizes the point that these forms are infinitely rarer than in *T. rhodesiense*. Details regarding the 7 strains are given, as also are figures of some of the posterior-nuclear forms encountered. These 7 strains on account of their origin and of the character of the infection they produced in man and animals must undoubtedly be regarded as *T. gambiense*. The author deals in some detail with the mechanism of the production of the posterior-nuclear forms. The mode of division of the long form is well known. The kinetoplast divides first and one of the daughter kinetoplasts moves forwards, the new flagellum being formed from it almost at once ; the nucleus then divides and the two daughter nuclei are situated one behind the other, the distance between their centres being approximately the same as that between the two kinetoplasts. Thus, in the two new individuals resulting from the division, the nuclei will be approximately in the same position in each.

Opinions are widely divided regarding the possibility of the division of the short form, but in the case of *T. rhodesiense* this possibility has never been questioned. Lavier states, however, there can be no doubt that when placed in favourable conditions the short form can divide fairly plentifully in *T. brucei* as also in *T. gambiense* and *T. rhodesiense.* The first organ to divide is the nucleus and some time later the second flagellum appears ; this is followed almost immediately by the division of the kinetoplast, the two portions of which remain on the same level ; so that at this stage there are two nuclei one behind the other, two flagella, and two kinetoplasts on the same level. The distance between the nucleus and the kinetoplast is consequently very unequal in the two individuals, and thus when division is complete we have two short forms in one of which the nucleus is much nearer the posterior extremity than in the other.

### 8. On the existence of *T. vivax* in man (G. Lavier). pp. 143–147.

After referring to the fact that in 1917 Macfie reported the discovery in a native of the Gold Coast of a monomorphic trypanosome resembling *T. vivax,* as seen in stained slides, the author passes to his own observations on the trypanosomes in the blood of a case of sleeping sickness which he studied at Entebbe. From this study he concludes that *T. gambiense* is capable of presenting itself in man with the appearance of *T. vivax*, and consequently, until the latter species has been recognized in man beyond question, after a full examination involving in particular observation in the natural state and inoculation into animals, it must be struck off the list of human parasites.

W. Yorke.

Carpenter (G. D. Hale). **Appendix to Report* of Senior Medical Officer, Sleeping Sickness, for 1925. A Statistical Enquiry into the Records of Fishing Permits issued on Lake Victoria since the Middle of 1922.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December.* 1925. pp. 92–95.

The investigations were made in August and October, 1925, so that the records for that year are not applied. Over 20,000 permits were examined and tabulated. The system of control of fishing on Lake Victoria was devised in 1922 by the Bacteriologist. A detailed account of the system is given and of the care taken to prevent fraud. The records are assembled in a series of tables, the first of which gives for each fishing area and for each half year the number of permits issued, divided into two classes, according to whether the glands of the applicants were only slightly or much enlarged. The following classification was adopted for the signs to be entered on the permits :—glands impalpable; +glands palpable, not easily punctured; ++ glands large, hard; +++glands large, soft, pulpy; and the appropriate record was made for the axillary and cervical glands of each side of the body separately.

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* With reference to the main part of Dr. Carpenter's Report, noticed in this *Bulletin* on p. 561–2, Dr. Carpenter points out that the word *Madi* on line 25 of page 562 should read *Aringa* (West Nile).

The second table shows for each half year the numbers of original and renewed permits issued. Rather more than 10,548 persons have received fishing permits since the middle of 1922.

The number of individuals who steadily pursued their craft for period after period diminished greatly after the first renewal, until only 254 applied for 5th renewals in the first half of 1925.

Table III shows the percentage of enlarged glands (++ or +++) in each area for each half year. Slightly enlarged glands are not included owing to differences of opinion as to whether certain glands should be classed as normal or slightly enlarged. The value of this table is based on the presumption that in any area contact with *palpalis* would, if the fly were infected with the human strain of trypanosome, cause a certain increase in the size of the lymphatic glands and that the fisherman in such an area would show a definite increase in the percentage of enlarged glands for a period following the date when human infection was sufficiently frequent to be so revealed. The figures suggest that such human infection has not occurred. For instance, in the Entebbe and Sese areas medical examinations for the 4th renewal (i.e., after the fisherman had been in contact with *palpalis* for four half years) in the second half of 1924 showed that there was no increase in the percentage of enlarged glands, and in the Entebbe area even six half years had produced no increase among the 25 men who applied for a sixth renewal. In addition, it may be stated that except in the Mjanji area microscopic examination of enlarged glands has not showed trypanosomes in any case.

W. Y.

[The figures given do not seem to warrant any conclusion, even a tentative one. In the attempt to get an indication of infection for each district the data have been split up into so many subdivisions that percentages are calculated on small numbers. And even if these percentages correctly represented the occurrence of enlarged glands among those re-examined there is no certainty that they in any way represent the incidence of enlarged glands among those exposed; for less than half of those originally examined appeared for even the first re-examination and the numbers appearing for subsequent re-examination fell off very rapidly.

Perhaps, if the districts were lumped together, and percentages of ++ and +++ were calculated on total original examinations, total first renewal, total second renewal and so on, some tentative idea of altered incidence of glandular enlargement might be obtained. But is glandular enlargement a sufficiently certain criterion of sleeping sickness infection to make all this figuring worth while?]

J. F. C. H.

TANGANYIKA TERRITORY. **A Report on Human Trypanosomiasis in Tanganyika Territory for the Year ending 31st December, 1926** by Dr. G. MACLEAN, Sleeping Sickness Officer.—34 typed pp. [Received from the Colonial Office 20th Apr., 1927.]

There are in Tanganyika Territory five separate areas where human trypanosomiasis is known to exist, and up to the present infection has not been traced from any one of these areas to another. These areas are: (*a*) Maswa-Ikoma; (*b*) Tanganyika Lake Shore Area; (*c*) Ufipa-Tabora Area; (*b*) Liwale Area; and (*e*) Rovuma Area. In all the areas, except the Tanganyika Lake Shore Area, the trypanosome is *T. rhodesiense.* The number of cases and deaths recorded for the years 1925 and 1926 respectively is shown in a table.

In a short section dealing with symptomatology, it is noted that the incubation period in one European, whose movements are known, could not have been longer than 27 days. No essential difference was observed in the symptomatology of cases in *G. swynnertoni* areas as compared with those infected in *G. morsitans* areas. In Liwale and Northern Ufipa, there is nothing to suggest that there is any vertebrate host of the parasites other than man. This applies also for the most part to Tabora, though here in a few cases the history of infection is not yet clear. In Southern Ufipa there have been some obscure cases which suggest that there may be foci of infection in certain uninhabited places. In Maswa the situation is obscured by the fishing and hunting habits of natives living in fly-free villages.

The preventive measures adopted consist briefly in sterilizing the peripheral blood of infected cases, reducing the contact between man and tsetse, and controlling the movements of natives in infected areas. Attempts to sterilize the peripheral blood generally go hand in hand with attempts to cure. So far as resources allow all except very advanced cases are now treated, the drugs employed being "Bayer 205," "Fourneau 309," tryparsamide, and tartar emetic.

An account is given of the various measures which are being adopted with a view to reducing contact between man and tsetse in *morsitans* and *palpalis* areas, respectively; and also of those in force for controlling the movements of natives. A summary is next given of the various methods of treatment in vogue. The drugs used almost exclusively are those mentioned above. The author believes that if "Bayer 205" is given sufficiently early in the disease in doses of 1 to 1·2 gm. over a period of 4 to 5 weeks it is probable that the majority of the cases will recover. In late cases the drug is very disappointing, dramatic improvement and apparent recovery being followed after a variable period (it may exceed a year) by relapse and death. In a third class of case the drug may be of more than usual value, i.e., the "ambulant" case with high natural resistance to the disease. The results obtained with "Fourneau 309" are similar. Tryparsamide alone has given good results in a few cases, but more frequently it fails to arrest the disease even when as much as 30 gm. is given.

Bayer and tryparsamide combined is a form of treatment which requires to be spread over a period from 4 to 6 months, and is consequently extremely irksome to the patient. Where a full course has been given, results on the whole are good, but hardly better than might have been expected from Bayer alone. The statement that a previous course of "Bayer 205" renders tryparsamide more likely to produce optic atrophy lacks absolute proof. Relapse cases are treated in the same way as late cases, but they usually react badly. The *gambiense* cases are best treated with tryparsamide.

The next portion of the report is concerned with a more detailed discussion of the sleeping sickness situation in the respective areas. In an appendix the results of treating a considerable series of patients with "Bayer 205" and tryparsamide, respectively, are set forth in a series of tables. The appendix also contains a note on the result of treating a case of sleeping sickness by intrathecal injection of "Fourneau 309" in oil. The patient had reacted unfavourably both to Bayer and tryparsamide and was blind, and extremely emaciated and weak. The first injection, consisting of 1·2 grains of the drug, apparently produced no ill affects, but the second injection, consisting of double the dose, given about ten days later, apparently killed the patient within a few hours.

W. Y.

LEDENTU (G.) & VAUCEL (M.). Répartition actuelle de la trypanosomiase humaine en Afrique Equatoriale Française. [**Present Distribution of Human Trypanosomiasis in French Equatorial Africa.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 511–523. With 1 map. [1 ref.]

Since 1925 the combat against sleeping sickness in French equatorial Africa has entered upon a new phase. The simple medical tour with a minimum of atoxylization has given place to a methodical inspection of the population village by village and subdivision by subdivision. The medicinal treatment is now more perfect and consists of six massive injections of atoxyl. The aim of the present communication is to give a brief summary of the results of these new measures. The report of BLANCHARD and LAIGRET (1924) serves as a base from which to appreciate the results of the modified measures of the last two years [this *Bulletin*, Vol. 21, p. 752].

A summary is given of the present state of affairs in the five following regions:—

(1) GABON.—*The estuary of Gabon-Como.* The whole of this region was revisited in 1925. The index of morbidity was 2·8 per cent., varying in different places from 1·09 to 4·03 per cent. In 1926 the only subdivision re-examined was Owendo and here the disease seemed to have progressed, the morbidity having risen from 2·14 per cent. to 4·32 per cent.

*Bas-Ogooué.*—This region has not been re-examined since 1921–1923.

*Moyen-Ogooué.*—Here the disease has assumed the form of a severe epidemic which fortunately prophylactic measures are now arresting. At Booué and its environments the percentage of infected, which was in 1922 about 1·2, had risen to 25 in 1925. It was atoxylized and re-visited in 1926, when the index of new infections was found to be 3 per cent. In the lower reaches of the Ivindo, the index of morbidity reaches the disquieting figure of 57·6 per cent.

*Haut-Ogooué.*—The focus at Lastourville-Franceville is still in a state of full activity, about 43 per cent. of the population on the banks of the Ogooué near Lastourville being infected in 1925. Here also the prophylactic measures give good hope, the index of morbidity at Lastourville having fallen from 39·6 in 1925 to 12·1 in 1926 and the new infections from 3·2 per cent. to 1·5.

At the confluence of the Sébé and Ogooué the index has fallen from 74 to 53·1 per cent. with 2·6 per cent. of new infections; but certain villages still exhibit enormous numbers of infected, varying from 77·5 to even 96·6 per cent.

The state of affairs in the other four sectors, viz (2) Djoué-Loudima; (3) the Congo and its tributaries; (4) the Oubangui, and (5) the valley of the Chari, is summarized in a similar manner. [The figures given are very striking and should be consulted by those interested in the original, as it is almost impossible to summarize briefly a condensed paper of this nature].

In conclusion, the authors write that the results given in this paper are the first which have been put together since the new method of prophylactic treatment recommended by BLANCHARD and LAIGRET, viz., 6 injections of atoxyl at 10 day intervals, together with systematic examination of the whole population, have been adopted. Taken as a whole the first results are most encouraging. If in certain places the disease seems resistant and the endemic has even progressed, the disappearance of the epidemic foci affords great consolation. The combat has been waged with evident success in the Brazzaville region and in the Djoué-Loudima sector, which has been the object of particular attention owing to the assembling of workers for the construction of the Congo-Ocean railway. The disquieting foci of Moukagni and Mossendjo have been practically extinguished and high percentages of infections are now only found in those subdivisions which have not yet had the benefit of massive atoxylization. Where a comparable effort has been made similar results have been obtained in the sectors of Oubangui (e.g. Bambari) and of Chari (e.g. Bouca-Marali), but where lack of personnel has not permitted of proper control of treatment progress has been unsatisfactory and the menace persists.

W. Y.

MACKAY (A.G.). **Report on the Incidence of Sleeping Sickness in the Lawra District, October, 1924.**—*Gold Coast Rep. Med. & San. Dept. for Period Apr. 1925—Mar. 1926.* Appendix E. pp. 61–71.

In view of the fact that 8 cases of sleeping sickness had been reported from Lawra during the twelve months ending July, 1924, and that an epidemic of sleeping sickness is believed to have devastated the district some forty years ago, it was considered important to ascertain whether the factors favourable to an epidemic still existed. The author visited the district and spent from September 30th to October 11th, 1924, examining the inhabitants of the various villages. The area from which cases of sleeping sickness are recorded extends from Baghari, 7 miles north west of Lawra, to Metaw, 3 miles due south. The area is probably 50 or 60 square miles and comprises Lawra itself and some 19 small villages. The number of cases of sleeping sickness which occurred in this area during the preceding 12 months was 29, and 6 of these were still alive and seen by the author. Details of the distribution of these 29 cases are given. Tsetse were found along the course of the Black Volta and its tributary, the Kamba, and probably also of its other tributary, the Konyonkwon. The banks of the Kamba river appear to offer ideal breeding grounds for *G. palpalis* and *G. tachinoides*. Although only these tsetse were seen by MacKay, it is stated that *G. morsitans* is known to exist in the district.

Some account is given of the distribution of Glossina. It is believed that the infection is contracted at the ferries and fords of the Black Volta, but it is also possible that it may be introduced from the French country beyond.

A brief clinical account is given of the 29 cases with some remarks on special symptoms and treatment. A number of recommendations for dealing with the situation are also made.

W. Y.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE. 1927. Apr. Vol. 20. No. 6. pp. 971–985 (Sect. Comp. Med. & Sect. of Trop. Dis. & Parasit. pp. 95–109) [2 refs.]. **Special Discussion on Trypanosomiasis in Man and Animals.** [ANDREWS (W. H.) MANSON-BAHR (Philip). THOMSON (J. Gordon), NEAME (Humphrey), HARVEY (D.) & MOORE (John).]

This discussion is of a general nature and contains nothing new. MANSON-BAHR confines himself to the treatment of trypanosomiasis in man and gives a résumé of the results obtained by the use of " Bayer 205 " and tryparsamide. THOMSON concerns himself with the question of the polymorphic trypanosomes in game and man in Africa and summarizes the views put forward by DUKE, THOMSON and ROBERTSON, TAUTE, the reviewer, and others. NEAME refers to keratitis in infected cattle, dogs, and man ; he states that it is sometimes accompanied by iritis and cyclitis. In severe cases necrosis of part of the cornea may occur, with a subsequent scar formation and very serious impairment of vision. HARVEY stated that whilst working with BRUCE in Nyasaland they had an opportunity of re-examining some of the original slides made by BRUCE in Zululand and were able to confirm what has since been frequently surmised, viz. that BRUCE had been working with three different species of trypanosomes, *T. congolense, T. vivax* and *T. brucei*. On comparing the Nyasaland *T. brucei* with that from Zululand it was noted that there was some difference in morphology. The latter strain showed a more exaggerated polymorphism and the posterior-nuclear forms were more numerous. These statements refer to the examination of films prepared from the blood of infected white rats. After passage through Nyasaland tsetse fly, which differs from the Zululand tsetse, these characteristics remain unchanged. Harvey added that whilst in Nyasaland they came across a monomorphic strain of *T. brucei* to which the name " the trypanosome of the naturally infected dog " was given. After many unsuccessful attempts they succeeded in infecting flies with this strain, in the hope that passage through the fly might cause it to revert to the polymorphic form ; but this proved not to be the case, as the trypanosome still retained its monomorphic form and low virulence for animals. Harvey considers that it may have been a similar strain which reached this country originally. This monomorphic strain might be the survivor of a mixed infection. It is unlikely that the change to monomorphic form took place by repeated inoculations, as it was already monomorphic when originally examined by PLIMMER and BRADFORD.

Referring to the alteration in virulence of trypanosomes by passage through an alternative host, Harvey recalls that *T. simiae*, which is remarkably virulent for monkeys and young domestic pigs, lost this virulence after passage through the goat.

W. Y.

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LEDENTU (G.) & VAUCEL (M.). La formol-gélification dans la trypanosomiase humaine. [**The Formol-Gel Reaction in Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 601–607. [Pasteur Inst., Brazzaville.]

The authors have applied the formol-gel reaction to the serum of patients in various stages of sleeping sickness. They consider that as the reaction is positive in syphilis and in a certain number of other infections it has from the qualitative point of view little interest to those practising in the tropics. But when the reaction rate is taken into consideration it gives interesting results in human trypanosomiasis.

In non-treated patients the reaction is very rapid (about 7 min.) in the first stage of the disease ; it is a little slower in the second stage, about 25 mins. in those whose spinal fluid contains trypanosomes, and 2 hours in those whose spinal fluid is changed but does not contain trypanosomes.

Treatment retards the reaction in the vast majority of cases and sometimes makes it negative, but its behaviour has no prognostic significance.

W. Y.

LEVADITI (C.) & KLARENBEEK (A.). Prophylaxie des trypanosomiases par ingestion du Moranyl (309 Fourneau ou 205 Bayer). [**Moranyl by Mouth in the Prevention of Trypanosomiasis.**]—*C. R. Acad. Sci.* 1927. May 16. Vol. 184. No. 20. pp. 1213–1214. [1 ref.]

Prophylaxis in trypanosomiasis by oral administration of chemical compounds is a question of the greatest importance. After having tried without much success many arsenical preparations, the authors have taken up the study of " Fourneau 309," or " Bayer 205," and have obtained in the rabbit certain results They found that when this drug was administered per os it exercised a definite and durable prophylactic action against nagana ; even a single dose of 0·1 gm. of body weight conferred protection for at least 39 days, lasting between 39 and 87 days. Among the 31 animals used only 2 failures were encountered. These were rabbits to which the drug had been given 24 and 48 hours respectively before inoculation. It therefore seems that the intestinal absorption of 309 occurs slowly, but when once the absorption has taken place the active principle persists a long time in the organism. Repeated small doses of the drug are also efficient from the prophylactic point of view.

W. Y.

BOSSERT. Compte rendu de l'expérimentation du 309 Fourneau dans le secteur de prophylaxie no. 1 (Afrique Equatoriale Française. [**Prophylactic Use of " Fourneau 309 " in French Equatorial Africa.**] —*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 460–464.

In September, 1925, it was decided to ascertain whether " 309 Fourneau " had the same immunizing action against human trypanosomes that it possesses against animal trypanosomes.

A place was chosen which had not been visited for more than a year, but where it was known that for some years the disease had been on the increase and the changes of infection were sufficiently great. On re-investigating the district a marked decrease of the disease was noted, but the proportion becoming infected was still considerable, the annual index of new cases being 11·35. The observation was conducted in 8 villages, 7 being on the road from Bambari to Moroubas and the other on the road from Bambari to Grimari.

The author proceeded on the following plan :—

All the infected were set aside and treated with atoxyl ; those free from infection were divided into two equal groups, the men, women, and children being in the same proportion in each. The first group served as a control and the individuals of the other group were injected with 309.

In all, 500 persons were injected with doses varying from 0·02 gm. per kilo to 0·04 gm. per kilo. Practically no untoward symptoms resulted. Seven months later the district was revisited, but owing to a mistake recruiting of labourers had taken place and only 267 of the 500 injected were found and 313 of the 503 controls. These were all most carefully examined for trypanosomes; none of the 267 injected was found to be infected, and 8 of the 313 controls, i.e. 2·5 per cent. Details are given in tables.

In an addendum it is recorded that DYLEFF visited the villages again in July, 1926, and found 108 of the injected who were not present at the previous examination in April. None of them was infected.

W. Y.

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STRADA (L.) & LOPES (A. J.). Notes complémentaires sur le traitement de la trypanose humaine par la Germanine (205 Bayer). **[Further Notes on the Treatment of Human Trypanosomiasis by Germanin.]**—*Ann. Soc. Belge de Méd. Trop.* 1927. July. Vol. 7. No. 1. pp. 1–13. [1 ref.] [Uele Sleeping Sickness Mission, Ango Lazaret.]

Further information is given concerning the 43 advanced cases of sleeping sickness treated during 1923 to 1925 with "Bayer 205." [this *Bulletin*, Vol. 23, p. 423]. In a table the following data are set forth—name of the patient, date of discovery of the illness, summary of the treatment administered, and information regarding the weight of the patient, the condition of the spinal fluid and the presence of trypanosomes, etc. Analysis of this table shows that of the 12 cases which were relatively well when treated, one was apparently cured, the spinal fluid returning to normal and the patient remaining well for a period of six months; 2 are dead, the condition of the spinal fluid becoming relatively worse; one has improved with only 10 cells per cmm. of the spinal fluid; and 8 still have pathological spinal fluid, which in 3 has become much worse.

Of the 31 grave cases, 9 are dead within a period of 3 to 7 months after treatment. One died by hanging, in one the spinal fluid had become practically normal, 3 had remained in *statu quo*, in 9 the lymphocytosis had decreased, and the remaining 8 are definitely worse. In all the patients the examination of the blood for trypanosomes by the triple centrifuging method was invariably negative. It is now proposed to treat those who are alive with tryparsamide.

The following are the conclusions :—

1. In cases of chronic trypanosomiasis with altered spinal fluid Germanin produces a diminution of the lymphocytes, but this is generally transient.
2. In some cases, which are comparatively rare, one observes several months after treatment an improvement of the spinal fluid or this condition has remained stationary.
3. In the greatest number of cases the disease continues to progress slowly to a fatal issue.
4. "Bayer 205," in the authors' opinion, is not an ideal drug for the treatment of trypanosomiasis.

W. Y.

JAMOT & VERNON. Nouvel essai de la tryparsamide dans le traitement des formes avancées de la trypanosomiase humaine. [**New Trial of Tryparsamide in the Treatment of Advanced Trypanosomiasis**].—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 689–695.

In this paper, which is based on 100 cases, the authors propose to show

1. The superior curative action of tryparsamide in advanced cases of sleeping sickness.
2. That its use is not incompatible, as certain authors believe, with the previous administration of atoxyl or emetic.
3. That it can be injected without inconvenience subcutaneously.

Among the 300 very advanced cases of sleeping sickness treated at the camp of Ayos (Cameroon), 124 had received, up to the time of writing, six injections of tryparsamide or had died during treatment. Of these 124 cases 19 have died—6 of intercurrent disease, 10 who were in a state of senile cachexia and who were given small doses of the drug, and 3 apparently from the drug. In six cases there was no modification of the meningeal reaction; and in one case amblyopia developed after the fifth injection.

There were 26 successes out of 38 cases with trypanosomes in the spinal fluid; at the end of treatment the parasites had disappeared and there was a considerable reduction of the lymphocytes and mononuclear leucocytes.

There were 60 good, or very good, results among patients exhibiting marked signs of nervous disease, and in whom there was an intense meningeal reaction with cells varying from 18 to 864 per cmm.

In all, 77·5 per cent. of results which could be classified as excellent or favourable were obtained.

It is noted that the cytological changes do not always coincide with the clinical results. The lymphocytosis may persist and the patient's general condition be greatly improved or vice versa. The desire of the patients to return to their villages caused the final puncture to be made two days after the last injection. If this could have been delayed it might have shown the drug had the prolonged effect which seems to be characteristic of it. A case is cited where the puncture immediately after treatment showed 21·8 elements, whilst that made 3 months later showed only 5·6.

The authors' observations do not confirm the view that previous treatment with arsenic or antimony renders the cases less favourable for tryparsamide: a number of cases are mentioned in support of this contention and in a table a summary is given of 27 cases in which the amount of atoxyl previously administered is known. These give 95 per cent. of good or excellent results notwithstanding the fact that they had previously had from 2·5 to 28 gm. of atoxyl.

Regarding the duration of the results obtained from tryparsamide reference is made to the observations of VAN HOOF and VAN DEN BRANDEN, of CHESTERMAN, and of MARQUEISSAC. Further information is given concerning two cases treated in the early part of 1924 by MARQUEISSAC and Jamot; these were alive and well with normal spinal fluid in February of this year. It is concluded that tryparsamide has a curative value which is almost constant, and a powerful and lasting action in cases where the meninges are involved.

The treatment consisted of 10 weekly injections, each of about 4 cgm. per kilo of body weight: the initial doses were based on the general state of the patient and only exceptionally was more than 3 gm. given for a strong adult. The drug was prepared by a French firm and the solution made at the time of injection; it was given subcutaneously. After various trials it was found that the strength of the solution should be 10 per cent. Such solutions are not more painful than atoxyl and cause no trouble.

W. Y.

LEDENTU (G.) & VAUCEL (M.). L'acétylarsan dans la trypanosomiase humaine. [**Acetylarsan in Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 524–535. [1 ref.]

Whilst in French Equatorial Africa atoxyl remains the clinical remedy for trypanosomiasis in the bush, a number of very successful observations have been made at the Pasteur Institute of Brazzaville with tryparsamide and more recently with "Fourneau 270." In the present paper the authors record the results obtained with acetylarsan and organic derivatives of arsenic—pentavalent as atoxyl—and belonging to the series of phenylarsinic acids as do tryparsamide and "270." The stability of the product in solution, its feeble toxicity, and its lack of neurotropism suggested that it might prove to be one of the best remedies. The test was conducted on 29 patients in different stages of the disease; details of all are given. Of the 22 patients in the first stage of the disease, 2 remained sterilized during an observation of 70 days, 18 relapsed and 2 are dead. Seven patients in the second stages of the disease were treated; of these one was at the commencement of this stage and was recognized as such only by lumbar puncture; the other six were well advanced cases and exhibited clinical signs of invasion of the central nervous system. Details of the seven cases are given. The effect of the drug on the peripheral injection was either nil or transitory. Concerning its effect on the cerebrospinal fluid, it is recorded that in one of two cases showing trypanosomes in the spinal fluid, the drug failed to cause the disappearance of the parasites. The action on the lymphocytosis was feeble and transitory; as was also its influence on the amount of albumose.

It is concluded that the action of acetylarsan on the trypanosomes in the haemo-lymphatic system is prompt, a dose of 0·7 gm. causing the disappearance of parasites from the glands within 8 to 24 hours in the majority of cases and from the peripheral circulation within about 7 hours. The action is, however, quite transient and relapses occur within 18 to 20 days. Its action on the cerebrospinal infection is uncertain and only temporary. The drug is perfectly tolerated and did not give rise to any ocular disturbance.

W. Y.

BOCK (Georg). Ueber Toxizität und trypanozide Wirkung von Antimonverbindungen mit 3- bzw. 5 wertigem Antimon (nach Versuchen mit Antimosan). [**The Toxicity and Trypanocidal Action of 3 and 5 Valent Antimony Compounds (Experiments with Antimosan).**]—*Ztschr. f. Hyg. u. Infektionskr.* 1927. Apr. 29. Vol. 107. No. 2. pp. 396–406. [7 refs.]

The following summary is given:—

1. Antimosan is in white mice and rats considerably more toxic in subcutaneous injection than in intraperitoneal administration.

2. By the addition of absorption-preventing colloids (gum arabic, gelatine, agar) the toxicity of the preparation on intraperitoneal administration is raised so as to approach that of subcutaneous injection.

3. Prevention of the otherwise extremely rapid excretion of the drug by ligature of both ureters in rats gave the following results :

(*a*) *On subcutaneous injection* : no increase in toxicity was observed ; possibly even more was tolerated than by the normal animals.

(*b*) *On intraperitoneal injections* : the toxicity of the drug was raised more than four-fold.

These observations render it probable that antimosan must undergo a chemical change in the organism. The view that it becomes oxidized is supported by the following observations.

4. An oxidation product of antimosan (No. 781) which contains antimony in the pentavalent form is but slightly toxic ; on subcutaneous injection at least 5 times as much is tolerated of antimosan ; moreover the ratio of the subcutaneous toxicity to the intraperitoneal toxicity is reversed in comparison with that of antimosan. As in the case of rats with ligatured ureters more is tolerated after subcutaneous than after intraperitoneal administration.

5. The oxidized pentavalent antimosan possesses no noteworthy trypanocidal property ; and similarly it was found that after ligature of the ureters the activity of intraperitoneally injected antimosan in rats infected with trypanosomes is lessened or even destroyed.

These experiments indicate that in the animal organism the very active and not unpoisonous antimosan with trivalent antimony is changed through oxidation into a less active compound containing pentavalent antimony. It is in this form that antimosan is destined to be excreted. Experiments on rats after ligature of the ureters showed that this oxidized compound, in contrast to antimosan, is better tolerated after subcutaneous than after intraperitoneal injection. It cannot be affirmed that a body chemically identical with " 781 " actually is formed in the animal organism ; but that chemical processes take place in a direction which tends to the formation of a non-poisonous oxidized product is, from the above experiments, very probable.

The author believes that in intraperitoneal injection of antimosan a very rapid and complete formation of the less active oxidation product takes place. This cannot, except in high doses, exert a toxic effect, because it is so quickly excreted ; but if the excretion is prevented poisoning is soon manifest. On subcutaneous injection both the formation and the excretion of the inactive oxidation product are slower and quantitatively less complete. The same is seen when antimosan is injected intraperitoneally with the addition of protective colloids. The result is greater toxicity, but a better trypanocidal action. Prevention of the excretion does not lead in this case to greater toxicity, because the oxidation product is better tolerated by the subcutaneous tissue. It must be assumed that both in normal and in ligatured animals on subcutaneous as well as on intraperitoneal injection there are definite oxidation-optima which vary according to the different conditions.

These investigations taken as a whole lead to the conclusion that differences in toxicity and therapeutic activity of the antimony compounds is dependent, as in the case of the arsenicals, on the action of the oxidation and reduction processes which occur in the living organism. The method of administration of the drug is not of negligible significance ; not only is absorption to be considered, but also the biological activity of the tissue into which the drug is introduced. W. Y.

PAPAMARKU (P.). Versuche ueber die Wirkung chemotherapeutischer Stoffe (Salvarsan, Trypaflavin und Antimonverbindungen) auf Spirochäten und Trypanosomen in vitro. **[Experiments on the Action of Chemotherapeutic Substances (Salvarsan, Trypaflavin, and Antimony Compounds) on Spirochaetes and Trypanosomes** *in vitro.*]—*Ztschr. f. Hyg. u. Infektionskr.* 1927. Apr. 29. Vol. 107. No. 2. pp. 407–415. [15 refs.]

The parasitic action of a drug in the animal body is often apparently very different from that of the drug *in vitro.* KOCH and BEHRING worked with a series of substances which exhibit a powerful action *in vitro,* but none *in vivo,* whilst on the contrary trypanrot and atoxyl are of chemotherapeutic value, but exert no action *in vitro.* This has led many authors to the conclusion that the drugs do not act on the parasites but on the host; EHRLICH, however, adhered to the view of a direct action. He explained the difference between the results obtained with atoxyl *in vitro* and *in vivo* on the ground that the drug is reduced in the animal body since the reduction product of atoxyl, viz. para-aminophenylarsenoxide killed trypanosomes *in vitro* in an hour, even when the drug is present only in a dilution of one in one million. In the case of many other drugs, e.g., trypanrot, no corresponding action *in vitro* has been demonstrated.

As regards salvarsan, the general view is held that in the test tube the drug has no action on spirochaetes; consequently the present work, which demonstrates such an action *in vitro* in a very simple manner, is not without interest. In his earlier experiments, commenced in 1919, the author examined the action of various salvarsan preparations, acridin substances and antimony compounds, on the spirochaetes of relapsing fever and on nagana trypanosomes *in vitro*; later, the action of mercury and silver preparations as well as optochin was examined.

In general the spirochaetes were more slowly affected and this is also the case in the animal body. According to SIMIC the trypanosomes take up the unchanged salvarsan, whilst the spirochaetes on the contrary take up only the oxidized drug. According to VOEGTLIN and SMITH the oxide is the really active substance; it kills trypanosomes immediately *in vitro.* If now one accepts with SIMIC that the spirochaetes only take up the drug when it has been oxidized in the body, whilst trypanosomes themselves are able to oxidize it, the apparent difference in action can be explained.

Since the papers of these authors only appeared in 1920 and 1921 after Papamarku had performed his experiments he has not had the opportunity of examining salvarsan oxide.

The author states that by means of the following simple technique he was able to observe trypanosomes and spirochaetes for several days living *in vitro.* An aqueous solution of neosalvarsan was diluted with physiological saline. The spirochaete or trypanosome blood was withdrawn from an infected mouse at the height of the infection and so diluted with inactivated rabbit serum that 3 to 8 parasites were seen to a microscopic field. To 0·2 cc. of the diluted blood in an Uhlenhuth's tube 0·1 cc. of the diluted drug was added, and after being well mixed covered with liquid paraffin. The tubes were kept at room temperature and samples removed from time to time by means of a capillary tube for examination under the dark field mircoscope.

The results of these experiments are set forth in a series of tables.

The following summary is given :—

The view that salvarsan *in vitro* is not directly harmful to spirochaetes is due to insufficiently long observation. When this is extended to from 24 to 48 hours, it is seen that 1 in 1,000,000 dilution kills the organism; nagana trypanosomes are rendered completely motionless by the same strength of solution in two hours. This difference can be explained according to Simic's hypothesis that the trypanosomes take up unchanged salvarsan, whilst the spirochaetes take it up only after it is oxidized.

Trypaflavin and other acridin substances immobilize both spirochaetes and trypanosomes *in vitro,* even in dilutions of more than 1 in a million: here also the spirochaetes are the more slowly influenced.

Tartar emetic and antimony trioxide act *in vitro* as they do *in vivo,* only on trypanosomes; these parasites are definitely influenced by dilutions of 1 in 30 millions, whereas spirochaetes remain motile in the presence of solutions of 1 in three hundred.

W. Y.

BROWNING (C. H.) & GULBRANSEN (R.). **Interference Phenomena in the Action of Chemotherapeutic Agents in Trypanosome Infections.** —*Jl. Path. & Bact.* 1927. July. Vol. 30. No. 3. pp. 513–519. [7 refs.] [Univ., & Western Infirmary, Glasgow.]

Reference is made to the fact that in 1922 the authors described under the term "therapeutic interference" an observation that one chemotherapeutic substance (parafuchsin) when present in the tissues of an animal infected with trypanosomes prevented the action of another (trypaflavin or acriflavine). This work was later confirmed and extended by SCHNITZER and by SCHNITZER and ROSENBERG [this *Bulletin,* Vol. 24, p. 571]. On account both of the great biological interest of chemotherapeutic interference and also of its practical importance in connexion with treatment, the authors have investigated the phenomenon further and have confirmed the results of SCHNITZER and his co-workers.

The following summary is given :—

"(1) The phenomenon of chemotherapeutic interference was originally described by us in the case of a parafuchsin-resistant strain of trypanosomes which in normal mice was susceptible to the trypanocidal action of trypaflavin, but was insusceptible to this agent when the infected animals were previously treated with parafuchsin.

"(2) The observations of Schnitzer with Rosenberg and Silberstein have been confirmed, viz. (*a*) that the trypanocidal action of other substances, e.g., arsacetin, is also interfered with by parafuchsin, when a subtherapeutic dose of the latter is administered before a therapeutic dose of the former and (*b*) that it is not necessary to conduct the experiment with a parafuchsin-resistant strain of trypanosomes, since the phenomenon may be observed with a normal strain.

"(3) Interference with the therapeutic action of arsacetin is produced by ethylviolet, a triaminotriphenylmethane dye related to parafuchsin, whereas tryparosan, belonging to the same group, and Döbner's violet, a diaminotriphenylmethane compound, have only an uncertain interfering effect. Trypanblue, a tetrazo derivative, shows some interfering action.

"(4) A small dose of parafuchsin interferes with the trypanocidal action of the related substance tryparosan, but does not interfere with a subsequent therapeutic dose of itself.

"(5) As regards the mechanism of interference, the facts indicate that this is due mainly to the direct action of the parafuchsin on the trypanosomes.

" (6) The bearing of the observations on Ehrlich's theory of chemoceptors is discussed. It is concluded that, while they are not incompatible with the theory, there is at present no simple explanation of the results."

W. Y.

CHAGAS (Carlos). Quelques aspects évolutifs du *Trypanosoma cruzi* dans l'insecte transmetteur. [**Developmental Appearances of *T. cruzi* in the Insect Transmitter.**]—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 829–832. With 3 text figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

Reference is made to the two forms which *T. cruzi* assumes in the blood of vertebrates. The first form is effilate, the nucleus is long and band-shaped and the blepharoplast is spherical and situated very close to the posterior extremity ; this form is extremely motile. The second is broader, the nucleus more or less oval and the blepharoplast voluminous ; this form is but sluggishly motile. The author believes that the former type represents the male element and the latter the female.

In his earlier works on the subject, Chagas believed that the parasite underwent two distinct methods of evolution in the insect. The first resembled what is seen in cultures, the trypanosomes multiplying by simple division and after passing through various intermediate stages becoming crithidia. In the second, conjugation of the male and female elements seen in the blood of the vertebrate took place, and then, after certain intermediate phases, the last stages, corresponding to the metacyclical forms of BRUMPT, were developed and became lodged in the hind gut of the insect.

Later studies have, however, compelled the author to modify his views. In some experiments he has encountered appearances which he believes represent fecundation between the sexual forms. The recent discovery of delicate trypanosomes, sometimes occurring singly and sometimes in agglomerations, in the mid-gut of Triatoma is of importance. These forms are seen 42 hours after the infecting meal and have nothing to do with the metacyclical forms of BRUMPT. They resemble those which Chagas has described from the salivary glands of the insect. It is supposed that they originate from the multiplication of the forms resulting from the process of conjugation of the male and female elements ; and Chagas believes that it is these forms which are injected when the insect bites. Further experiments on the subject are in progress.

W. Y.

DE FARIA (Gomes) & CRUZ (Oswaldo). Sobre a occurrencia de um estagio intracellular de desenvolvimento do *Trypanosoma cruzi* no *Triatoma megista* (Burm.) (Nota prévia). [**An Intracellular Stage in the Development of *Trypanosoma cruzi* in *Triatoma megista*.**]—*Bol. Inst. Brasileiro de Sci.* 1927. June 30. Vol. 3. No. 1. pp. 375–379. With 3 text figs.

By permission of Professor CHAGAS the authors obtained for dissection ten specimens of *Triatoma megista* infected with *Trypanosoma cruzi* in his laboratory.

In the wall of the hind-gut they found within the mucosa cells, apparently in a sort of vacuole, two forms of the flagellate ; some were ovoid or pyriform, 4–6 microns in length, mostly without a flagellum, though some seemed to possess a rudimentary one ; others of the true trypanosome form. Probably this stage is necessary before the insect can become capable of transmitting the disease.

H. Harold Scott.

NIÑO (Flavio L.). Formas culturales del *Schizotrypanum cruzi.* [**Cultural Forms of** *Schizotrypanum cruzi.*]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 528–530. With 30 figs. on 2 plates.

The author obtained good results by employing defibrinated human blood and 2 cc. to 10 cc. of melted agar. From infected guineapigs blood was taken by heart-puncture, mixed with 2 per cent. sodium citrate, introduced into the medium and allowed to remain at room temperature. Excellent growth was obtained in the water of condensation.

On the fifth day, pyriform, oval, and elongated forms, motionless and with granular protoplasm were seen. They were few in number and non-flagellated. The oval forms measured 7 by 4 microns, the longer 10 by 2 microns.

On the tenth day multiplication had taken place, the elements being smaller, still non-flagellated ; 6–8 microns in length by 2–3 in width.

By the fifteenth day occasional flagellated forms were seen, free, of the leishmania and leptomonad types, and more of a rounded or oval shape. Rosettes made up of ovoid or elongated forms were seen.

On the twentieth day sparse round or oval forms were present, singly or in groups, small, motionless, leishmanial in type, 3 by 2 microns. Long forms, however, predominated, markedly motile, possessing flagellum but no undulating membrane. Four days later minute leishmania forms, grouped in large numbers, and many freely moving flagellated forms were observed, 35–50 microns in length (exclusive of the flagellum) by 1·5–3 microns in width. The various forms are well depicted on two coloured plates.

H. Harold Scott.

MUNIZ (Julio). Sobre algumas formas interessantes encontradas em culturas de *Trypanosoma cruzi.* [**Some Interesting Forms found in Cultures of** *T. cruzi.*]—*Bol. Biol.* São Paulo. 1927. Apr. 11. No. 5. pp. 16–19. With 9 figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

——. Quelques formes intéressantes trouvées dans des cultures de *Trypanosoma cruzi.*—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 821–823. With 7 figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

This note relates to certain forms found in a culture of *T. cruzi* in NNN medium. It is recorded that large numbers of delicate forms of the trypanosome were found similar to those described by CHAGAS in the salivary glands of Triatoma.

The forms, however, to which the author desires to draw particular attention consist of groups of banana-shaped elements grouped like the segments of an orange. These agglomerations are of two distinct types ; the first consisting of a dozen or more elements each with a small condensed nucleus and some showing a blepharoplast, the second consisting of large and less numerous elements with a voluminous nucleus in which the chromatin is arranged in rays. There is still a third interesting type consisting of banana-shaped elements which probably represents a previous stage to that already described ; the nuclei are very numerous and the chromatin is condensed ; these last forms have been found only in small numbers.

Reference is made to the fact that LEBEDEFF (1910) has found somewhat similar forms in cultures of *T. rotatorium.* Muniz records that in studying a culture about 15 days old he has seen numerous large crithidia moving very slowly *in situ*, and also a number of smaller and more delicate forms which exhibit rapid translatory movement. Whilst following one of these under the microscope he observed it approach one of the large comparatively motionless forms to which it became attached by its posterior extremity. After about 15 minutes the large form commenced to round up and exhibit movements within its cytoplasm, whilst the more delicate form diminished in length and increased slightly in breadth. After about 25 minutes the movements of the flagellum of the latter form became very intermittent. The observation was interrupted by drying of the preparation. The author believes what he saw represented fecundation.

W. Y.

DAVIS (L. J.) & BROWN (H. C.). **The Adhesion Phenomenon, a Specific Serological Reaction occurring in Trypanosomiasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. pp. 113–124. [16 refs.] [Wellcome Bureau of Sci. Research, Endsleigh Gdns., London.]

Reference is made to the work of RIECKENBERG (1917) who showed that the blood of rats, which had recovered from, or been cured of, an infection with *T. brucei*, caused masses of blood platelets to become adherent to the trypanosomes *in vitro*. The reaction was specific, not only for the species of trypanosome, but also for certain strains employed, and sufficed to differentiate the original from relapse strains. RIECKENBERG emphasized the point that the reaction only occurred when citrated plasma was used and that he was unable to obtain it with serum. KRITSCHEWSKI and TSCHERIKOWER (1925), working with *T. equiperdum*, found that in this reaction the specificity did not reside in the platelets, for these could be replaced by those of normal vertebrates. They considered that the reaction depended upon a specific principle present in fibrinogen which they termed " thrombocytobarin," in that they claimed that the reaction would only take place when plasma and not when serum was used. They further showed that the antibody in question was thermostabile, but that the reaction depended upon the presence of normal complement. Later they found that the antibody could be produced by the injection of dead trypanosomes, and that the immune plasma could withstand a dilution of 1 in 12 without weakening the strength of the reaction. They failed to produce the reaction with the serum from clotted blood, but with the serum from defibrinated blood or with citrated plasma they obtained a strong reaction. KRANZ (1926), who worked with *Treponema duttoni*, found that the rôle of the platelets was merely mechanical, for bacteria would serve equally well as indicators of the reaction ; he showed that the serum from clotted blood gave a definite reaction in the case of this organism. It was subsequently found that the reaction would occur with other organisms, e.g., KRITSCHEWSKI and TSCHERIKOWER (1926) used *Leptospira icterohaemorrhagiae* and MESSIK (1927) obtained this adhesion phenomenon with *Leishmania tropica*, but failed to do so with a free-living amoeba referred to as *Amoeba limax*.

In their earlier experiments the authors confined their attention to a strain of *T. equiperdum* which killed mice in three to four days. For the production of immune plasma the infected mice were cured by a dose of 0·1 cc. of a 1 per cent. solution of " Bayer 205." After a suitable interval the mouse was killed with ether and the maximum amount (about 0·5 cc.) of blood obtained by cardiac puncture ; the blood was then added to an equal volume of 1 per cent. citrated saline, mixed and centrifuged. The trypanosome suspension was obtained from moderately infected mice ; this blood was treated in the same way, but centrifuged slowly so as not to throw down the trypanosomes.

The test is made by mixing equal quantities of the immune plasma and trypanosome suspension in a small agglutination tube and incubating at 37° C. for about half an hour. A drop of the mixture is then examined by dark field illumination ; in a positive reaction the trypanosomes are seen to be freely motile though often exhibiting characteristic laboured movements ; adherent to them are seen formed elements of the blood—especially blood platelets, more rarely leucocytes, as also the smaller particles " blood dust " invariably seen in such preparations. All degrees of adherence may occur, from a solitary platelet stuck usually to the extremity of the flagellum to an almost complete envelopment of the organism by numbers of platelets. In many cases the trypanosomes are solitary, in others they tend to agglomerate in small masses, in and round which are entangled numerous platelets. As shown by LAVERAN and MESNIL this agglomeration is a non-specific phenomenon which often occurs when trypanosomes are exposed to the influence of foreign sera.

It was found that at least 5 days should elapse between the administration of the drug and the collection of the blood ; apparently it does not matter when the drug is given, provided it is after the definite establishment of the infection, but it must not be delayed until either the mouse becomes moribund or resistant strains of trypanosomes have developed. The optimum period of incubation varies from a few minutes at room temperature in the case of sera producing a well-marked reaction to one hour at 37° C. in less strongly marked reactions.

Rabbits were found capable of producing effective antibodies one week after infection without the use of any drug, but as the infection in these animals runs a chronic and usually fatal course, it is better to give a curative dose of 0·005 gm. of " Bayer 205 " per kilo. of body weight. No difficulty was experienced in producing antibodies in guineapigs both against trypanosomes and leptospira.

Experiments showed that contrary to the statements of RIECKENBERG and of KRITSCHEWSKI and TSCHERIKOWER serum is an efficient substitute for plasma. If the serum and plasma are taken under aseptic conditions and kept in the ice chest, the specificity remains for at least three weeks.

The actual titre which the serum or plasma of an immunized animal may reach varies considerably. In the case of immunized mice, titres of 1 in 12 to 1 in 18 were frequently obtained, but with guineapigs and rabbits considerably higher titres were produced. Further work confirmed the statement of BRUSSIN that blood platelets served merely as indicators and that they could be replaced by bacteria. Colloidal inorganic suspensions served as did also gamboge ground up in saline and then filtered.

The antibody exhibits a high degree of thermostability and withstands 65° C. for two hours. Such results as the authors did obtain have not supported the view that the reaction is dependent upon the presence of complement. Experiments performed with the serum of animals immunized against *T. equiperdum*, *T. lewisi*, *T. rhodesiense* and *T. evansi*, respectively, showed absolute specificity. Similarly, working with several strains of leptospira, the authors experienced no difficulty in differentiating by means of this test two types, viz., the pathogenic *L. icterohaemorrhagiae* and the free living water strains *L. biflexa*.

In the concluding discussion regarding the nature of the antibody, the authors suggest that it may be allied to opsonin. There is at present no convenient word with which to designate the phenomenon. Russian workers have alluded to it as " the Rieckenberg," " thrombocytobarin " or " beladung " reaction. In view of the earlier observations of the French workers and of RÖSSLE (1905), it is doubtful whether it should be called the Rieckenberg phenomenon. It has been shown that the term " thrombocytobarin " is inapplicable, and the authors suggest that the reaction might be called " the adhesion phenomenon."

W. Y.

BRUSSIN (A.) & BELETZKY (W.). Ueber die Verwertung des Rickenbergschen Phänomen bei Immunitätsfragen. [**Application of the Rickenberg Phenomenon to Immunity Questions.**]—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskomissariats.* 1926. Vol. 2. German summary p. 22. [In Russian pp. 5–22. Refs. in footnotes.]

An investigation of the Rieckenberg or thrombocytobarin phenomenon in connexion with *Trypanosoma equiperdum* infection of mice has shown that the reaction is highly specific and distinguishes not only different races of trypanosomes but also those of a relapse from those of a first attack and even those which occur at different stages of an infection. A single mouse may have in its blood at one time a number of these antibodies each specific for the particular race of trypanosome which stimulated its production. The blood of a mouse will retain these substances for 2½ to 3 months.

C. M. Wenyon.

CORDIER (G.). Etude de la glycémie et action du sérum glucosé et de l'insuline dans quelques cas de trypanosomiase expérimentale. [**Glycaemia and Action of Serum-Glucose and Insulin in Experimental Trypanosomiasis.**]—*C.R. Soc. Biol.* 1927. Apr. 26. Vol. 96. No. 13. pp. 971–973.

The work of Kurt SCHERN has caused the author to examine the variations in the glycaemia of animals experimentally infected with a trypanosome of Morocco and with *T. equiperdum*, and also the effects of injections of serum-glucose and of insulin on the appearance and number of trypanosomes and on the duration of the infection.

In sheep, guineapigs and rats infected with the Moroccan virus the degrees of glycaemia had no definite relation to the degree of infection; in a horse the amount of blood sugar decreased regularly with the appearance of parasites, but tended to return to normal without, however, reaching it, during the last days of the infection.

In a horse infected with *T. equiperdum* the first clinical symptoms coincided with pronounced hypoglycaemia. At this time examination of the blood and tissue juices was negative, but inoculation of the blood into rats gave rise to infection. The hypoglycaemia was diminished by treatment and when the clinical symptoms disappeared the amount of sugar in the blood had recovered. In regard to the effects of serum-glucose and insulin on infections due to the Moroccan virus three series of rats were infected. The first series received each day 1 cc. of serum containing 5 per cent. of glucose, the second lot received each day insulin, and the third lot were kept as controls. Thirty-six hours afterwards the blood was found to be positive in the rats injected with serum-glucose and in those kept as controls without any appreciable difference in the number of trypanosomes. The following day the rats to which insulin was given also showed parasites. One of the control rats died on the fifth day, the following day the rats to which insulin was given died, and two days later the rats treated with serum-glucose and the remainder of the controls. In view of the fact that there was no appreciable difference between the course of the infection in rats treated with serum-glucose and the controls, it can be assumed that trypanosomes of the Moroccan strain are not directly dependent on the glucose of the organism.

In guineapigs infected with the strain the duration of life is considerable, although the blood at times contains numerous parasites. Injections of serum glucose and of insulin had no effect on the course of the infection in two of these animals.

W. Y.

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REGENDANZ (P.) & TROPP (C.). Das Verhalten des Blutzuckers und des Leberglykogens bei mit Trypanosomen infizierten Ratten. [**The Behaviour of the Blood Sugar and the Liver Glycogen in Rats infected with Trypanosomes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Aug. Vol. 31. No. 8. pp. 376–385. [10 refs.] [Inst. for Ship & Trop. Dis., Hamburg.]

The authors have examined the behaviour of the blood sugar in a considerable series of rats infected with trypanosomes in order to elucidate further the question of the occurrence and significance of its removal in trypanosomal diseases. They have reached the conclusion that in infected rats it is only shortly before death that the sugar is markedly decreased in amount. The disease is not due to consumption by the parasites, but to the effect of their toxins on the sugar-formation organs.

The glycogen content of the liver of rats which have died from trypanosomiasis is lowered, but is still sufficient to maintain the blood sugar at its normal value.

Death in trypanosome-infected rats is not due to a lack-of-sugar intoxication, but to the action of toxins of the parasites.

W. Y.

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BRUYNOGHE, DUBOIS & BOUCKAERT. Le sucre du sang au cours des trypanosomiases expérimentales. [**The Blood Sugar in the Course of Experimental Trypanosomiasis.**]—*Bull. Acad. Royal de Méd. Belge.* 1927. Feb. 26. 5th Ser. Vol. 7. No. 2. pp. 142–156. [10 refs.]

The authors have repeated and extended the observations of SCHERN on the effect of the blood sugar in experimental trypanosomiasis. They employed in their work *T. brucei ugandae* in mice, guineapigs and rabbits.

The following are the conclusions:—

1. In the course of intense blood infections the trypanosomes kept *in vitro* lose their mobility the more quickly the further the infection is advanced, except during trypanolytic crisis which intervenes as a factor in the opposite direction.

2. The immobilization of the trypanosomes *in vitro* is inhibited by the addition of various sugars, especially glucose, which blood constituent is evidently a normal food of the parasites.
3. The injection of insulin into an infected animal diminished definitely the length of survival *in vitro* of the trypanosomes.
4. The blood of animals with intense infection of some duration exhibits hypoglycaemia which may be notable.
5. The physiological mechanism of this hypoglycaemia is not associated purely and simply with the consumption of organic glycose by the parasites, or with hepatic lesions, but rather with an insulinic mechanism.
6. Analysis shows a diminution of the hepatic glycogen and an increase of muscular glycogen—a fact which is in accord with the above hypothesis.
7. The hypoglycaemia is of no import clinically.

W. Y.

BATTAGLIA (Mario). Das Oedem bei den Trypanosomeninfektionen. [**Oedema in Trypanosomal Infections.**]—*Cent. f. Bakt.* 1. Abt. Orig. 1927. Aug. 5. Vol. 103. No. 4/5. pp. 267–268. [9 refs.]

The author states that oedema is a constant sign in all trypanosomal infections ; it may appear in the first period of the infection, or in an advanced stage, or finally in the cachetic period. The oedema is of a hard, myxoedematous type, wherever it appears. He recalls that in his examinations of the histological changes of the organs of experimentally infected animals he has found severe alterations in the thyroid and parathyroid glands. An account of the histological findings in these organs is given, and it is to these pathological lesions that the author attributes the oedema.

W. Y.

IWANOW (E.) & MESNIL (F.). Le trypanosome de la dourine traverse-t-il la peau ou les muqueuses saines? [**Can the Trypanosome of Dourine traverse Sound Skin and Mucous Membrane?**]—*Ann. Inst. Pasteur.* 1927. May. Vol. 41. No. 5. pp. 497–512.

The question whether trypanosomes can penetrate intact mucous membranes is still under discussion. According to some authors only *T. equiperdum* possesses this power, whilst others state that *T. brucei*, *T. evansi*, *T. gambiense* and *T. rhodesiense* have it also. NATTAN-LARRIER asserts that *T. equiperdum* can traverse not only the membranes of the eye, but also those of the mouth, vagina, rectum, and even the intact skin ; whilst IWANOW has reached quite the contrary opinion, and explains the successful results obtained by other workers on the hypothesis that there were minute abrasions of the surface.

In the present work the authors have re-investigated the subject. They employed a strain of *T. equiperdum* maintained many years in mice or guineapigs. The blood was withdrawn from mice on the last day of life, when it was swarming with trypanosomes, and diluted with sodium citrate solution. The experimental animals were examined carefully with the aid of a lens and all showing the slightest abrasion were set aside. The selected animals were placed in cages without straw or grass, the bedding, in the case of rabbits and guineapigs, consisting of sawdust and the food of fresh lucerne. The mice were kept in heavy glass bowls covered with wire netting and were fed on grains of sarrazin carefully examined, from which the grains of oats and barley were removed. An experiment was not commenced until the selected animal had been kept under these conditions for a fortnight, so that any abrasion which had escaped observation had time to heal.

From experiments which are described, the authors conclude that like the other pathogenic trypanosomes *T. equiperdum* is unable to penetrate the unbroken skin or mucous membranes. They point out that this finding in no way contradicts what is known of the propagation of dourine, because even the slightest lesions suffice to allow the parasites to traverse the mucous surface. The authors believe that careful examination of the genital organs would lessen appreciably the percentage of cases of the disease, and they suggest that in places where dourine is prevalent artificial fecundation of the mares should replace the natural coitus.

W. Y.

Regendanz (P.) & Kilkuth (W.). Ueber die Bedeutung der Milz für die Bildung des vermehrungshindernden Reaktionsproduktes (Taliaferro) und dessen Wirkung auf den Infektionsverlauf der Ratten-Trypanosomiasis (*Tryp. lewisi*). Versuche der Uebertragung des *Tryp. lewisi* auf die weisse Maus. [**Significance of the Spleen in the Formation of Multiplication-Inhibiting Reaction Products (Taliaferro) and its Action on the Course of** *T. lewisi* **Infection. Transmission of** *T. lewisi* **to White Mice.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Aug. 5. Vol. 103. No. 4/5. pp. 271–279. [20 refs.] [Inst. for Ship and Tropical Diseases, Hamburg.]

The following summary is given :—

1. The multiplication-inhibiting reaction product (Taliaferro) which appears in the serum of rats infected with *T. lewisi* is formed chiefly spleen.
2. The reaction product has no trypanocidal or lytic action, but simply inhibits multiplication of the parasites. The final disappearance of *T. lewisi* from the blood is likewise due to the development of trypanolytic or trypanocidal bodies.
3. After extirpation of the spleen *T. lewisi* infection in rats is severe and may be even fatal.
4. *T. lewisi* is not transmissible to white mice from which the spleen has been removed.

W. Y.

Battaglia (Mario). Akute und chronische Speicheldrüsenentzündung bei experimentellen Trypanosomiasen. [**Acute and Chronic Inflammation of the Salivary Glands in Experimental Trypanosomiasis.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. May 12. Vol. 102. No. 6/7. pp. 382–385. [9 refs.]

The author states that in his prolonged studies on the pathogenic trypanosomes of animals, he has found that the parasites pass from the placenta to the foetus, and that they are polymorphic in their development, exhibiting a filterable phase in which they will pass through a porous candle capable of holding up *Micrococcus melitensis*, and a non-filterable phase. The trypanosomes produce pathological lesions in all the animal tissues from the skin to the central nervous system.

In animals with experimental trypanosomiasis (*T. vespertilionis*, *T. lewisi*, *T. dromedarii* and nagana) lesions—sometimes acute and sometimes chronic—of the salivary glands were observed. The author gives an account of the clinical and pathological appearances.

W. Y.

TAKEYAMA (Sadawo). **[On the Trypanosomicidal Action of Bacterial Toxins. Communication I.]**—*Fukuoka Ikadaigaku Zasshi (Jl. Fukuoka Med. Soc.)* 1926. Oct. Vol. 19. No. 10. [Summarized in *Japan Med. World.* 1927. May 15. Vol. 7. No. 5. p. 147.]

After referring to the work of LEVADITI and TWORT on *Bacillus subtilis*, the author remarks that he has demonstrated the existence of a trypanocidal substance produced by *Bacillus mesentericus fuscus* Flügge. This substance is free in the culture fluid and can be removed by dialysation. It is unstable in sun-light, and also in heat and after shaking and desiccation, but resistant to cold and X-rays. It had a prophylactic and curative action for *T. lewisi*, but was powerless against *T. gambiense* and *T. equiperdum*.

W. Y.

BRUMPT (E.). Eclectisme alimentaire des réduvidés vecteurs du *Trypanosoma cruzi*. **[Food Eclecticism in Reduviid Carriers of *T. cruzi*.]**—*Presse Méd.* 1927. Sept. 24. Vol. 35. No. 77. pp. 1161–1162. With 4 text figs.

The author speaks of food eclecticism in a sense very different from that commonly current, applying it to Reduviid bugs whose tastes are so far from exclusive that they will feed not only on man, mammals, birds and insects, but also (as he has discovered lately) on reptiles and frogs. His attention was drawn to this matter by observing the existence of *Triatoma rubrovaria* in stony tracts in Uruguay where iguanas and another smaller species of lizard were the only vertebrates visible. As he expected in these circumstances, he found that the larvae of this Reduviid fed without hesitation on the (small) lizards—though they attacked a small bat that he had in his possession with equal relish. On returning to Paris he found that his captive Reduviids would feed on the grass snake (*Tropidonotus natrix*), a lizard (*Lacerta viridis*), a freshwater tortoise (*Emys lutaria*) and a frog. On one occasion large nymphs of *Triatoma megista* immediately after a preliminary repast on a pigeon, indulged themselves to fatal repletion on a snake. These facts suggest to the author the possibility of reptiles and batrachia being natural reservoirs of *Trypanosoma cruzi*, since NINO at Buenos Aires inoculated a toad, *Bufo marinus*, with that trypanosome—although BRUNNI failed in his attempts at so infecting batrachians.

A. Alcock.

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CARPENTER (G. D. Hale). Some of the Problems connected with Sleeping Sickness. A Paper communicated to the Zoological Section of the British Association for the Advancement of Science. 10 pp. 1926. Aug. 9.

KING (Harold). Trypanocidal Action and Chemical Constitution. Part VI. Amphoteric s-Carbamidoarylarsinic Acids.—*Jl. Chem. Soc.* 1927. May. pp. 1049–1060. [National Inst. Med. Research, Hampstead.]

# HELMINTHIASIS.

CHATTERJI (Dhruba Mohan). **The Incidence of Intestinal Parasites in a Calcutta Hospital Population.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. p. 252.

During 1925–6 a routine examination was made of the stools of the 371 patients admitted to the surgical wards of the Calcutta Medical College Hospitals and is of interest as revealing the percentage of Calcutta natives harbouring various parasites.

TABLE I.—GENERAL FINDINGS.

| | Per cent. |
|---|---|
| *Ankylostoma* ova in 43 specimens ... ... ... | 11·6 |
| Ova of *Trichuris trichiura* in 11 specimens ... | 3 |
| Ova of *Taenia saginata* in 2 specimens ... ... | 0·5 |
| Ova of *Ascaris lumbricoides* in 20 specimens ... | 5·4 |
| Ova of *Hymenolepis nana* in 5 specimens ... ... | 1·3 |
| Ova of *Oxyuris vermicularis* in 3 specimens . . ... | 0·8 |
| *Trichomonas hominis* in 23 specimens ... ... ... | 6·2 |
| *Chilomastix mesnili* in 5 specimens ... ... ... | 1·3 |
| *Lamblia intestinalis* in 14 specimens ... ... ... | 3·8 |
| *Endolimax nana* in 17 specimens ... ... ... | 4·6 |
| *Entamoeba histolytica*, or its cysts, in 12 specimens ... | 3·2 |
| *Entamoeba coli*, or its cysts in 20 specimens ... | 5·4 |
| *Iodamoeba butschlii* in 1 specimen ... ... ... | 0·3 |
| *Strongyloides* larvae in 7 specimens ... ... ... | 1·9 |

TABLE II.—CLASSIFICATION BY CASTE AND SEX.

| | Per cent. |
|---|---|
| Total number of stools examined of Hindus was 193: of these, the number of positives, i.e., those which show some sort of parasites or ova was 87 ... ... ... ... ... | 45·1 |
| Total number of stools examined of Mahomedans was 68: of these the positives were 28 ... ... ... ... ... | 41·2 |
| Total number of stools examined of Europeans was 98: of these the positives were 23 ... ... ... ... ... ... | 23·5 |
| Total number of stools examined of other castes was 3: of these only 1 was positive ... ... ... ... ... ... | 33·3 |
| Total number of stools examined of male patients was 304: of these the positives were 119 ... ... ... ... | 39·1 |
| Total number of stools examined of female patients was 60: of these the positives were 20 ... ... ... ... ... | 33·3 |

R. T. Leiper.

DE MELLO (Froilano) et al. Note sur la fréquence des parasitoses intestinales à l'Inde Portugaise par les élèves du cours de microbiologie Luis Gabriel FIGUEIREDO, Constancio Roque MONTEIRO, Govinda Xencora NAIQUE, Roque Eduardo FURTADO, Miguel CARVALHO, Visnumdassa CORONGOTO & Balchandra Narconim SANVORDENCAR. Travail entrepris sous la direction et avec la colaboraton effective du Prof. Froilano DE MELLO. **[Frequency of Intestinal Parasites in Portuguese India.]**—*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* 1927. Ser. A. No. 1. pp. 29–48. [Bact. Inst., Nova Goa.]

The contents of this paper are mainly statistical, dealing with the incidence of various parasites in certain districts and villages of

Portuguese India. 596 cases gave the following percentages of infection: Ascaris 75 per cent., Trichocephalus 48 per cent., Ankylostomes 32 per cent., Strongyloides 7 per cent., Oxyuris 8 per cent., Taenias 2 per cent.

R. T. L.

MILLS (Ralph G.). **Parasites, chiefly Metazoan, observed in 7,000 Specimens of Feces from Koreans, with an Attempt to interpret the Findings.**—*Amer. Jl. Hyg.* 1927. May. Vol. 7. No. 3. pp. 222–263. With 5 text figs. [55 refs.]

Mills summarizes the records of the Clinical Laboratory of the Severance Union Medical College between September, 1913 and June, 1917. The results represent fairly well the conditions prevailing in the population at large, as the hospital clientèle represented all classes of the Korean people in about the true proportion. The survey is, therefore, not a parasitological one as relatively few applied for treatment of parasitic infections. *Ascaris lumbricoides* is a surprisingly uniform infestation irrespective of occupation. Home conditions are more important than all other factors. Infection is most probably due to cultivation of family garden plots, eating with unwashed hands and contamination of food, especially fresh vegetables and salt pickle. *Oxyuris vermicularis* is associated with lack of cleanliness, scarcity of soap, eating with unwashed hands and contamination of bedding. Hookworm disease is rare, while hookworm infection with small numbers is prevalent. The habits of the Korean people are not favourable to the production of extremely severe infections. *Strongyloides intestinalis* is relatively unimportant. *Clonorchis sinensis* is attributed to the eating of dry rather than raw fish. Bilharziasis is absent. This interesting paper concludes with a description of the disposal of night soil and the preparation of fertilizers practised by the Korean people. The author does not believe in racial immunity to helminth infestation, inclining rather to the belief that light infections depend on local conditions.

R. T. L.

MCCULLOCH (W. E.). **The Incidence of Amoebic and Helminthic Infections in Kano and Katsina Cities, Northern Nigeria.**—*Jl. Trop. Med. & Hyg.* 1927. May 2. Vol. 30. No. 9. pp. 117–119.

Owing to a severe outbreak of amoebic dysentry in the Kano Administration Prison, the author undertook a microscopic examination of the stools of 500 natives to ascertain the degree of parasitic infestation in Northern Nigeria, of which Kano is the industrial centre and Katsina the headquarters of learning and agriculture. Katsina showed a much higher incidence rate of infection with Ancylostoma and Ascaris, whereas *Entamoeba histolytica* proved far more prevalent in Kano. A peculiar feature of 17 cases of ankylostomiasis was the occurrence of local swellings, fever, and eosinophilia. Tapeworm infection with *Taenia saginata* is practically universal and forms a large percentage of the out-patient practice. The native method of cooking meat in balls of solid beef leaves the centre quite raw. Both species of Schistosoma infection are common. Microfilariae are rare and only four cases of elephantiasis have been seen by the author among 6,000 cases examined. Dracontiasis is extremely common in both Kano and Katsina. Twenty-five per cent. of all ulcers seen at the Katsina hospital are due to guinea-worm.

R. T. L.

CALLANAN (J. C. J.). **A Record of the Occurrence of Intestinal Parasites in Patients at the Native Hospital, Nairobi.**—*Kenya & East African Med. Jl.* 1927. July. Vol. 4. No. 4. pp. 103–113.

Examination of single faecal specimens in 1,000 cases gave 48·7 per cent. infection with helminths. The species which occurred were Hymenolepis, *Taenia saginata*, *Ascaris lumbricoides*, *Trichuris trichiura*, Ancylostoma, *Strongyloides intestinalis*, *Heterodera radicola* and *Schistosoma mansoni*. The author gives several tables showing the varying combinations of species which were observed.

R. T. L.

WILTSHIRE (H. G.). **Some Observations of Intestinal Parasites of Natives at Mlanje.**—*Nyasaland Protectorate Ann. Med. Rep. for Year ending 31st Dec. 1925.* Appendix II. pp. 30–33.

Wiltshire has given in tabular form results of routine examination of faeces of 30 patients attending the Mlanje Native Hospital and an equal number of natives in normal health, viz. policemen, warders and hospital attendants. His analysis shows a great preponderance of amoebic and schistosome dysenteries. The helminth infections among the 60 cases were *Ascaris lumbricoides* 21, *Ancylostoma duodenale* 17, *Schistosoma mansoni* 8, *Strongyloides intestinalis* 4, and *Taenia solium* 4. These figures are regarded by the author as minimal. A concentration method would almost certainly have given higher figures. The absence of whipworm eggs is notable.

R. T. L.

SICÉ (A.). Le parasitisme intestinal dans le sud de Madagascar. [**Intestinal Parasitism in the South of Madagascar.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 464–467.

In southern Madagascar *Taenia saginata* is common. Nematode infections are also very prevalent—Ascaris 90·6 per cent., Trichuris 93·3 per cent., hookworm 1·6 per cent., *Oxyuris vermicularis* 21·7 per cent.

R. T. L.

POPOFF (P. P.). L'helminthologie médicale en l'U.S.S.R. de 1921 à 1927. [**Medical Helminthology in U.S.S.R. 1921-1927.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 5. French summary pp. 324–328. [10 refs.] [In Russian pp. 265–270.]

M. Popoff as Chef de Service of the Tropical Institute of Moscow summarizes the results obtained during the last six years in the domain of helminthology by workers in Soviet Russia, and lists 5 trematodes, 7 cestodes and 17 nematodes, with an unidentified species of Acanthocephala as parasites of man in Russia. The paper contains an eloquent tribute to Professor SCRIABINE.

R. T. L.

MTCHEDLIDZE (I. Z.). Sur l'extention dans l'Adjaristan de l'invasion vermineuse en général et de l'ankylostomiase en particulier. **[Distribution of Hookworms and other Helminths in Adjaristan.]** —*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 5. French summary pp.304-305. [In Russian pp. 302-304.]

The first enquiry into the helminth fauna of Adjaristan (Batoum) was undertaken in 1925 when the first case of ankylostomiasis of local origin was noted. Anthelmintic treatment has now established the presence of an endemic centre of hookworm in Adjaristan. From the records of the antimalarial station during 1925-6 it appears that 100 per cent. of the population is infested with helminths, *Ascaris lumbricoides* and whipworm predominating. *Taenia saginata* and *T. solium* occur in 5 per cent. and *Hymenolepis nana* in 2 per cent.

R. T. L.

OLEINIKOV (S. V.). **[Helminthic Infections in Ufa detected in Scrapings from the Peri-Anal Folds.]**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 3. pp. 162-164. [In Russian.]

For the detection of helminthic infections in Ufa (Eastern Russia) the author examined scrapings from the peri-anal folds of 927 persons of different ages. A flat polished wooden rod was introduced into the anus to a depth of 1½—2 cm, and the material thus obtained together with the scrapings was examined microscopically. Eggs of the following forms were detected by this method: *A caris lumbricoides, Trichuris trichiura, Taenia solium, T. saginata, Hymenolepis nana.*

C. A. Hoare.

DE LA BARRERA (J. M.) & RIVA (A.). Indice de helmintiasis intestinal en la población escolar de la República Argentina. (Provincia de Corrientes). **[Index of Intestinal Helminth Infection in Schools of Argentine.]**—*Semana Méd.* 1927. Aug. 18. Vol. 34. No. 33 (1753). p. 467. [Bact. Inst., National Dept. of Hyg., Buenos Aires.]

In this brief preliminary note the authors give a statistical summary of the degree of infection in 1,689 pupils in 47 schools in the Province of Corrientes in the Argentine Republic. 73·4 per cent. were found infected with parasites. Hookworm occurred in 68·85 per cent.; whipworm 10·59 per cent., *Ascaris lumbricoides* 3.49 per cent., *Hymenolepis nana* 1·83 per cent., *Taenia saginata* 1·07 per cent. and *Strongyloides stercoralis*, ·12 per cent. Within the Province the incidence varies from 80 per cent. and 100 per cent. to 3 per cent.

R. T. L.

HEIN (Gordon E.). **Cedar Oil as an Aid in finding Parasitic Ova in Feces.**—*Jl. Lab. & Clin. Med.* 1927. Aug. Vol. 12. No. 11. pp. 1117-1118. With 2 text figs. [Univ. of California Med. School. San Francisco, Calif.]

A smear of faeces from about five to ten times as heavy as ordinarily would be used is made upon a slide and allowed to dry. If this is cleared with cedar oil and and examined under a coverslip ova can be found without difficulty where repeated search of fresh smears without concentration failed to reveal them.

R. T. L.

FERNÁN-NÚÑEZ (M.). **A Contribution to Helminthic Therapy.**—*Jl. Amer. Med. Assoc.* 1927. Mar. 19. Vol. 88. No. 12. pp. 903–905.

Fernán Núñez finds that the best drug against Trichocephalus is the sap of *Ficus laurifolia* (Leche de Higueron). It is not easily obtainable however and the best alternative is oil of chenopodium, a single dose of 40 minims followed by an ounce of castor oil being recommended. The drug *must* be fresh and pure or it may prove toxic. He finds that intramuscular injections expel both whipworms and oxyuris and he has treated 69 cases successfully in this way. Intravenous injections in 13 cases were likewise successful; while the use of arsphenanines intravenously is partly successful. Injection of dogs with a vaccine prepared from the eggs of Trichocephalus seemed to prevent the development of adults in these animals.

T. W. M. C.

FERNÁN-NÚÑEZ (M.). **Intravenous Injections of Vermifuges.**— *Vet. Med.* 1927. June. Vol. 22. No. 6. pp. 227–229.

Oil of chenopodium is stated to be the most satisfactory vermifuge against hookworm and oxyuris. A single dose of 40 minims followed immediately by an ounce of castor oil is less dangerous than, and as efficient as the usual method of divided doses. From a few cases the author concludes that oil of chenopodium by intramuscular or intravenous injection is a specific against whipworm and oxyuris. The injection of whipworm eggs into dogs at three day intervals for one month apparently conferred an immunity against re-infection for seven to twelve months.

R. T. L.

CARMAN (J. A.). **A Note on the use of Glycerin as an Anthelmintic in Ankylostomiasis.**—*Kenya & East African Med. Jl.* 1927. July. Vol. 4. No. 4. pp. 123–125. [1 ref.]

From a study of ten cases by the direct flotation method the author concludes that glycerin will not remove hookworms even in lightly infected cases and cannot be recommended as an anthelmintic.

R. T .L.

SHILLINGER (Jacob E.). **Anthelmintic Properties of Santonin.**—*Jl. Agric. Res.* 1927. May 1. Vol. 34. No. 9. pp. 839–845. [2 refs.]

Critical testing on dogs, swine and horses shows an anthelmintic value for santonin much below that recently claimed. Its chief advantage is the ease of administration. The author is of opinion that it is a much over-rated drug at present, but that it has value especially in repeated treatment, principally as a drug which does not cause irritation and may therefore be used in cases with gastro-enteritis.

R. T. L.

BOUGENAULT. Note sur l'emploi de l'émétique en lavements dans: I.—Un cas de bilharziose intestinale. II.—Deux cas de vers de Guinée. [**Tartar Emetic per Rectum in Schistosomiasis and Dracontiasis.**—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 285–286. [2 refs.]

Bougenault has administered emetine, per rectum, to a case of schistosomiasis with success, giving 0·25 gm. in 50 gm. of water daily, for six days. A similar treatment for guinea-worm in two different cases resulted in the disappearance of the parasite.

R. T. L.

MARTINI (E.). Neues ueber Wanderungen und Wirtswechsel bei parasitischen Würmern. [**Recent Work on Migrations and Life Histories of Parasitic Worms.**]—*Ztschr. " Die Erde."* 1925. Vol. 3. No. 1. pp. 24–28.

This short communication briefly deals with the more recent additions to knowledge concerning certain of the tapeworms and round-worms, referring more specially to the work of ROSEN and JANICKI on the development of Dibothriocephalus and allied forms and recent additions to knowledge concerning the life-history of *Filaria loa* and Ascaris.

R. T. L.

TOH (Sai). [**On the Results of Examination of the Intestinal Parasites and Visceral Parasites of the Koreans.**]—*Chosen Igakkwai Zasshi* (*Jl. Chosen Med. Soc.*) 1926. Aug. No. 66. [Summarized in *Japan Med. World.* 1927. Mar. 15. Vol. 7. No. 3. pp. 78–79]

Toh examined 2,000 Koreans together with 400 patients applying to the hospital. The most widely spread parasites are ascaris, hookworm and whipworm.

R. T. L.

i. SEMENOW (G.). Aperçu général de la distomatose, provoquée par *Fasciola hepatica* L. en rapport avec sa propagation en Asie Centrale. [*Fasciola hepatica* **Infection in Central Asia, treated with Emetine.**]—*Pensée Méd. d' Usbekistane.* 1927. No. 2. French summary p. 117. [In Russian pp.13–29. With 3 text figs. 45 refs.]

ii. —— & KOGAN (D.). Un cas de distomatose, provoquée par *Fasciola hepatica* L. et guéri par les petites portions de chlorhydrate d' émétine.—*Ibid.* French summary p. 118. [In Russian pp. 30–38.]

iii. PAWLOWA (O. N.) Zur Klinik und Therapie der Leber-Distomatose. —*Ibid.* German summary pp. 118–119. [In Russian pp. 39–46. With 1 chart in text. 8 refs.]

i. Semenow gives a general account of the appearance and prophylaxis of *Fasciola hepatica* infestation, 19 human cases of which have been reported from Russia up to 1926.

ii. A new case of Fasciola infection in a woman is recorded. Emetine was given and appeared to cure the infection.

iii. Pawlowa discusses the clinical appearance and blood picture in Fasciola infections in man. Therapeutic measures include the intramuscular injection of emetine.

R. T. L.

PAUL (Fritz). Distomiasis hepatica (Leberegelseuche) beim Menschen. **[Liver Fluke in Man.]**—*Med. Klin.* 1927. June 3. Vol. 23. No. 22 (1173). pp. 829–834. With 9 text figs. [11 refs.]

The common liver fluke of sheep, *Fasciola hepatica*, is seldom found in man; not more than 40 cases have been reported in the last 100 years. The author contributes details of two further cases.

R. T. L.

LEON (M.). Accouplement et fécondation du *Fasciola hepatica*. **[Copulation and Fecundation in** *F. hepatica*.]—*Ann. Parasit. Humaine et Comparée.* 1927. July 1. Vol. 5. No. 3. pp. 236–238. With 1 fig. [4 refs.] [Faculty of Med., Jassy.]

A photogram is given showing two specimens of *Fasciola hepatica in copula*. The flukes are opposed by their ventral surfaces and the carrier of one is inserted in the vagina of the other and vice-versa.

R. T. L.

BUGGE (G.). Zur Entwicklung der *Fasciola hepatica*. I. Entwicklung des Darmes. **[Development of Gut of** *F. hepatica*.]—*Deut. Tierärzt. Woch.* 1927. Sept. 3 & 10. Vol. 35. Nos. 36 & 37. pp. 575–581; 594–596. With 7 text figs. [19 refs.] [Municipal Meat Inspectorate, Berlin.]

This contribution discusses in considerable detail the development of the dendritic gut so peculiarly characteristic of the genus *Fasciola*.

R. T. L.

PIGOULEWSKY (S. W.). Un cas de *Fasciola gigantica* Cob. chez un enfant usbék en Vieux Taschkent. **[Case of** *F. gigantica* **Infection in an Usbek Child in Tashkent.]** —*Pensée Méd. d'Usbekistane.* Taschkent. 1927. No. 6–7. French summary p. 131. [In Russian pp. 59–61. 7 refs.]

The diagnosis is based on the finding of eggs in the faeces.

R. T. L.

STOLL (Norman R.), CORT (W. W.) & KWEI (W. S.). **Egg-Worm Correlations in Cases of** *Fasciolopsis buski* **with Additional Data on the Distribution of this Parasite in China.**—*Jl. Parasit.* 1927. Mar. Vol. 13. No. 3. pp. 166–172. [4 refs.]

The success of egg counts in securing information on the severity of hookworm infestations suggested the application of the same method to other worm parasites and the authors have taken the opportunity to study intensively six individuals infected with *Fasciolopsis buski*. The investigation of this parasite proved to be relatively simple and generally speaking the results were considered to be more accurate than those as obtained for hookworm. It was ascertained that the egg output per fluke per day ranged from 14,623–48,125 ova; the mean output lying between 21 and 28 thousand ova. The dilution egg counting method proved to be superior to the smear method in determining the incidence of infection. A useful table is given showing, from an examination of 6,009 persons, the incidence of *F. buski* in several parts of the Kiangsu Province of China. Only 88 cases were found, forming less than 2 per cent. of the number of cases examined.

R. T. L.

Barlow (C. H.). **The Treatment of Fasciolopsiasis.**—*China Med. Jl.* 1927. Mar. Vol. 41. No. 3. pp. 253–265. With 1 plate & 1 chart. [6 refs.]

Fasciolopsis infection has long been known to Chinese doctors, who have used areca-nut combined with cathartics in its treatment. It has been largely superseded by turpentine which, however, is liable to produce nephritis. Carbon tetrachloride is the most efficacious drug which the author has employed, but it has been attended with untoward results and on this account he does not recommend it. Where the cases have taken the drug well the cure has been prompt and complete and there have been no after effects. Oil of chenopodium required repeated doses. B-naphthol proved much superior in its action, and it is the drug of choice because of its relative safety, cheapness and ease of administration. The most effective dose for adults is 75 grains administered in three half-hourly portions; for a very weak child from 12–21 grains and for a sturdy child 60 grains may be given in similarly divided doses.

R. T. L.

Semionow (G. M.) & Garmatty (K. I.). Un premier cas de constatation en U.R.S.S. de l'invasion humaine par *Fasciolopsis buski* Lank. [**First Case of Human Infestation by** *F. buski* **in U.S.S.R.**] *Pensée Méd. d'Usbekistane.* Taschkent. 1927. No. 6–7. French summary pp. 130–131. [In Russian pp. 49–57. With 3 figs. 14 refs.]

*Fasciolopsis buski* has not been recorded up to the present time from Soviet Russia. The present case had visited India in 1914.

R. T. L.

Scriabin (K. I.), Podiapolsky (V. P.), Sankin & Limtcher (L. F.). [**The First Case of Pulmonary Paragonimiasis discovered in U.S.S.R.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 2. pp. 75–82. [In Russian.]

This case though referred to as the first discovered in Russia, is actually that of a Korean, who had been resident in the country for several months only, having contracted the infection in the Far East. Faecal examination revealed the following parasites: *Ancylostoma duodenale, Paragonimus ringeri, Taenia saginata, Trichuris trichiura, Enterobius vermicularis.* By means of X-rays 12 foci of Paragonimus were located in the lungs. Treatment was successfully carried out with emetine hydrochloride. Doses of 1·25 cc. of a 2 per cent. solution were administered subcutaneously four times a day five days in succession. After an interval of a fortnight the course was repeated. Examinations of sputum during two months following treatment revealed no more eggs of the fluke.

C. A. Hoare.

Martin (S. H.). **Paragonimiasis and its Treatment.**—*China Med. Jl.* 1927. May. Vol. 41. No. 5. pp. 457–460. [3 refs.]

The emetine treatment of two cases of paragonimiasis was greatly shortened by the initial use of mercurochrome. One of the cases required seventy injections of emetine alone to produce a cure. Tartar emetic does not seem to be as effective in this disease as in schistosomiasis.

R. T. L.

FAUST (Ernest Carroll) & KHAW (Oo-Keh) assisted by KE-FANG (Yao) & YUNG-AN (Chao). **Studies on** *Clonorchis sinensis* **(Cobbold) with a Consideration of the Molluscan Hosts of** *Clonorchis sinensis* **(Cobbold) in Japan, China and Southeastern Asia and other Species of Molluscs closely related to them** by Bryant WALKER.—*Amer. Jl. Hyg.* Monographic Series No. 8. 1927. Mar. pp. xi+284. With 14 plates and 33 text figs. (4 maps).

In these studies the authors cover practically the whole field presented by the problem of Clonorchis infection in China. The opening chapter gives an historical résumé in which they express the opinion that Looss was not only in error zoologically speaking in creating two species of Clonorchis, purely on size differences after a study of preserved specimens, but that he perpetuated a fallacy in regarding *Clonorchis endemicus* as pathogenic and *C. sinensis* as non-pathogenic.

While dogs and cats commonly harbour Clonorchis in north and central China, human cases are unknown in North China and are rare in the Yangtse valley where cats are found uninfected. Human infection in China is almost entirely confined to the Kwangtung Province.

The second chapter deals with biological and morphological studies on the consecutive phases in the life-cycle of the parasite. Self-fertilization was frequently observed. Egg laying is independent of egg formation, the supply of eggs being stored up for some time in the coils of the uterus, resulting in their further development. Embryonic development takes place *in utero*. Egg formation begins in worms which are about 14 days old, but the eggs are usually absent from the faeces until about the 28th or 30th day. The Clonorchis egg resembles closely that of Metorchis. The eggs do not hatch spontaneously. The authors consider that a mechanical factor is important in bringing about hatching. The miracidium, sporocyst and redia are carefully described. Although the mollusc *Parafossarulus striatulus* is reported throughout the entire area in which Clonorchis infection is endemic in China, the authors have never found it infective in ponds containing infected fishes. *Bithynia fuschsiana* appears to be the chief species actually concerned in N. China. They regard *Bithynia longicornis* as a less important, potential host.

*Melania hongkongensis* can also act as an efficient intermediary under certain conditions. The morphology of the cercaria is described and it is stated that it can live a free existence for a period of 24–48 hours after which encystment occurs either in a fresh water fish or free in water. In the latter case the encysted larvae lying at the bottom of the water die when the reserve of food has been exhausted. Over 30 species of fishes are listed as intermediary hosts of the encysted cercaria. *Pseudorasbora parva* is the fish most commonly involved, but appears to be less heavily infected in China than in Japan. In Peking a most commonly infected fish is a Cyprinoid *Hemiculter kneri*. Practically any mammal that consumes raw fish in the Sino-Japanese areas is a potential host.

Chapter 3 deals with epidemiology. Clonorchis infection is confined to the Orient. There is no indication that the endemic area has ever extended as far as the Philippine Islands. Text figures and maps are given to illustrate in detail the epidemiology in China.

In chapter 4 the authors' studies on experimental therapy are detailed, particularly the effects of merchurochrome and gentian violet.

Chapter 5 discusses the prevention of clonorchiasis in man. The problem is practically limited to endemic regions in which raw fish is considered a delicacy or in which semi-raw fish is consumed. Sterilization of fish for human consumption by heat, and the sterilization of faeces in endemic regions are the two lines along which the practical solution of the problem can be attained.

The monograph concludes with a chapter by Dr. Bryant Walker on the Molluscan hosts of *Clonorchis sinensis* and species related to them. There is an extensive bibliography arranged historically and listed again alphabetically under authors. R. T. L.

OLDT (Frank). **Is Clonorchis a Health Menace in China?**—*China Med. Jl.* 1927. Mar. Vol. 41. No. 3. pp. 185–204. With 2 diagrams. [6 refs.]

There is a very heavy infestation with *Clonorchis sinensis* among the farmers round Siu Laam in Kwangtung. Fish from this region are sold to Canton, Hongkong and other places. Around Canton there is 20–30 per cent. human infestation and here human consumption of raw fish is prevalent. The price of the fish is so high as to preclude its being fed to dogs and cats, which are consequently only slightly infected. The fish, eaten raw, come from ponds in the mulberry districts. Laboratory records show that there is a preponderance of infection in males as compared with females, and it is explained that raw fish is usually eaten in restaurants which Chinese women do not patronize. Owing to the expensive nature of the fish there is a significantly large proportion of infection among business people, for poorer people cannot afford to eat it. Those farmers who raise and eat their own fish become infected; those who do not raise fish cannot afford to buy it, and are clonorchis free. The evidence presented by the author indicates that clonorchis infestation is a sharply limited disease, depending upon the custom of consuming raw fish. Under present conditions there is no danger of infestation spreading beyond its present boundaries or of being introduced into other countries. The incidence of liver troubles is more than twice as great in positive as in negative cases. Gall stone, Banti's disease, cancer, and liver disease with ascites predominate in clonorchis positive cases. The author considers that this infestation must be regarded as an exciting cause of cancer. From his clinical studies he concludes that the presence of clonorchis does not ordinarily excite symptoms and that there is no group of symptoms that could be properly called clonorchiasis. Considering all factors clonorchis infestation is probably less harmful than ascaris. Heavy infestations, however, produce serious pathological conditions in the liver in some cases. In the discussion of the paper Dr. FAUST referred to the liver enlargement in 50 per cent. of cases and the definite gastro-intestinal symptoms noticed by Japanese workers. While agreeing that the answer to Dr. Oldt's query is "No," such unqualified answer cannot be given in regard to adjacent endemic areas. R. T. L.

SHIRAI (Mitsuji). **Studies on the Treatment of Experimental Liver-Distomiasis with "Neostibnal."**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 633–645. With 5 figs. on 1 plate. [11 refs.]

By modifying stibnal, the author has prepared a new drug "neostibnal" which is an alkalified sodium antimony tartrate. When dogs infested with *Clonorchis sinensis* were given 15 intravenous injections of 0·011 gm. per kilo of body weight on alternate days, 75 per cent. of the worms in the liver were exterminated, while 45 per cent. were killed when 18 injections of 0·0088 gm. were used. The parasites from treated cases showed remarkable atrophic changes. The yellowish red granules filling the excretory bladder of the worms were shown chemically to have originated from the drug. The parasite does not become drug-fast after repeated injection of neostibnal.

R. T. L.

CORDES (Wilhelm). **A Case of Clonorchiosis.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 147–148.

This case of Clonorchis infection occurred in a Chinese from Canton who had entered Cuba eight years previously and had been admitted to hospital for malaria. Treatment with tartar emetic greatly reduced both the ascites and the number of eggs in the stool. The tenderness of the liver subsided and the organ reverted to normal size.

R. T. L.

PROMMAS (C.). **Report of a Case of** *Opisthorchis felineus* **in Siam.**—*Ann. Trop. Med. & Parasit.* 1927. Mar. 25. Vol. 21. No. 1. pp. 9–10.

Prommas records a case of *O. felineus* infection from Siam in a boy of 17 years, over 1,000 specimens being recovered from the slightly enlarged liver.

T. W. M. Cameron.

NISHIGORI (Masao). **The Life Cycles of Two New Species of Heterophyidae found in Formosa.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1927. Mar. No. 264. English summary pp. 2–3. [In Japanese.]

The English summary of the Japanese text states that this paper describes the structures and life-cycles in detail of two new species of Heterophyidae named *Monorchotrema taihokui* and *M. taichui*, an English version of which has been published as a joint paper with Dr. E. C. FAUST [*ante*, p. 512].

R. T. L.

ASADA (Junichi). [**Studies on the Life History of Katsurada's Heterophyes.**] —*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1926. Nov. Nos. 2498 & 2499. [Summarized in *Japan Med. World.* 1927. Mar. 15. Vol. 7. No. 3. p. 77.]

Numerous encysted cercariae were found in the "bora," a species of brackish water fish, very commonly eaten by the Japanese. Dogs and cats pass eggs of *Heterophyes katsuradaii* in 7–9 days after being fed upon these infested fish.

R. T. L.

CAWSTON (F. G.). **South African Fluke-Carriers.**—*Jl. Med. Assoc. S. Africa.* 1927. June 25. Vol. 1. No. 12. pp. 309–310. With 1 text fig.

*Limnaea truncatula* is very rare in the Union of S. Africa, so that its importance as a carrier of *Fasciola hepatica* is small, its place being taken by the larger species *L. natalensis.* From the latter species Bilharzia cercariae have been reported, but this occurrence must also be exceedingly rare. It is remarkable that *Isidora africana,* the common intermediary of bilharzia in S. Africa, is seldom affected by amphistome cercariae, while *Isidora tropica* and *I. forskali* are heavily infested. The danger of introducing molluscs into new habitats is illustrated by the presence of *Limnaea natalensis*, which are now found breeding in the pool which forms part of the War memorial in the town gardens at Durban and must have been introduced on the roots of the water-lily plants which have added beauty to this memorial. The introduction of *Physopsis africana,* a carrier of bilharzia, is similarly possible.

R. T. L.

CAWSTON (F. G.). **Some Notes on the Effect of Desiccation upon Molluscan Disease-Carriers.**—*Ann. Trop. Med. & Parasit.* 1927. Mar. 25. Vol. 21. No. 1. pp. 35–38. With 5 figs. on 1 plate. [2 refs.]

Cawston finds that the molluscan carriers of schistosomes and other flukes in South Africa resist drying for several hours at a time, and that they can be sent by post in a dry condition. The presence of air is more important than moisture.

T. W. M. C.

BETTENCOURT (A.) & BORGES (I.). La bilharziose au Portugal. A propos du mémoire de P. REMLINGER sur l' absence de la bilharziose à Tanger. [**Bilharziasis in Portugal. Its Absence from Tangier.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 350–364. With 9 figs. on 2 plates. [42 refs.]

The authors continue the discussion on the probable route by which *Schistosoma haematobium* has reached Portugal and draw attention to the coincidence of the relatively high temperature of the waters at the endemic foci throughout the year. This may have played an important part in the maintenance of these foci of infection, which are limited to three centres—Tavira, Alportel and Estoi in the ancient kingdom of Algarves.

R. T. L.

EMILE-WEIL (P.). Un cas parisien de splénomégalie bilharzienne d'origine martiniquaise. [**Case of Bilharzial Splenomegaly from Martinique.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Mar. 24. Year 43. 3rd Ser. Vol. 51. No. 10. pp. 344–352. [6 refs.]

Emile-Weil records a case of splenomegaly due to *Schistosoma mansoni* in a young man who had contracted the infection in Martinique during childhood ; and he points out that this disease is not confined to Egypt.

R. T. L.

LAMPE (P. H. J.). **The Development of** *Schistosoma mansoni.*—*Proc. Roy. Soc. Med.* 1927. July. Vol. 20. No. 9. pp. 1510–1516 (Sect. of Trop. Dis. & Parasit. pp. 56–62.) With 4 figs. [Military Hosp., Paramaribo, Dutch Guiana.]

Dr. Lampe finds *Planorbis guadeloupensis* as well as *P. olivaceus* naturally infected with *S. mansoni* in Surinam. Oral infection by the miracidium is considered to be the most frequent method of infection of the snail. The number of cercariae discharged by an infected snail is estimated at 172,000, or 2,646 daily. The measurements of the cercariae of *S. mansoni* taken by the author do not agree with those of other observers. Cercariae enter incised skin more readily than normal. They do not make use of hair follicles or pores. In the light of his experiments the author is doubtful if skin penetration of the extremities is of common occurrence in man. Mucous membrane infection always produced good results. The author favours the direct passage of the cercaria from the lung through the visceral pleura and diaphragm to the liver.

R. T. L.

PORTER (Annie). **Notes on the Structure and Life-History of a Variety of** *Schistosoma spindalis* **Montgomery observed in South Africa.**—*S. African Jl. of Sci.* 1926. Dec. Vol. 23. pp. 661–666. [2 refs.]

Two cases of human infestation with *Schistosoma spindalis* have been observed by the author in S. Africa. One was a European who had worked with cattle and goats in S.W. Africa, the other a young native cattle herd from Northern Transvaal in whose urine both *S. spindalis* and *S. haematobium* occurred. The paper contains detailed descriptions of the ova, miracidia, sporocysts and cercariae of *S. spindalis*. These developmental stages occur in *Planorbis pfeifferi* and *Isidora tropica*. Slight differences between the ova found in these cases and those found in Indian cattle are regarded as indicative of a distinct strain or race for which the name *S. spindalis* var. *africana* is suggested.

R. T. L.

CAWSTON (F. G.). **The Snail Host for Bilharzia in Zanzibar.**—*Jl. Trop. Med. & Hyg.* 1927. Aug. 15. Vol. 30. No. 16. p. 209.

*Isidora* (*Physopsis*) *ovoidea* Bt. is known only from Zanzibar. It may be distinct from *Isidora africana* (Krauss) and not merely a variety. The author surmises that it is the intermediary of *Schistosoma haematobium* in Zanzibar.

R. T. L.

RIZZO (Carlo). Il primo caso di bilharziosi intestinale osservato in Cirenaica. Contributo nosogeografico e clinico alla conoscenza delle Schistosomiasi umane. [**First Case of Intestinal Bilharziasis seen in Cirenaica.**]—*Riforma Med.* 1927. June 13. Vol. 43. No. 24. pp. 555–561. With 2 microphotographs & 1 map in text. [Numerous refs.]

This apparently autochthonous case of intestinal bilharziasis in Cirenaica was due to infection with *Schistosoma mansoni*.

R. T. L.

MILLER, Jr. (Harry Milton). **Comparative Studies on Furcocercous Cercariae.**—*Illinois Biol. Monographs.* 1926. July. Vol. 10. No. 3. 112 pp. With 8 plates & 2 text figs.

Owing to the fact that the cercariae of the Schistosome worms possess a bifurcated tail, this zoological monograph is of interest to medical workers. Miller has considered all trematode larvae which are furcocercous, although this larval character occurs in different groups. From a study of the parasites of North American molluscs the author has added seven new species to the list of North American furcocercous cercariae.

R. T. L.

BREMER (Karl). **Certain Aspects of Hydatid Disease.**—*Jl. Med. Assoc. S. Africa.* 1927. June 25. Vol. 1. No. 12. pp. 301–304.

In the Karroo the inhabitants depend chiefly upon the sheep industry for a living. Almost all the hydatid cases come from the sheep farms, and only a few occur in towns. Of 4,071 admissions to the Midland Hospital (Graaff-Reinet) 25, or 0·6 per cent., were for hydatid, while out of 660 major operations 23, or 3·5 per cent., were for hydatid cysts. It would seem, on a rough estimate, that about half per cent. of the population show signs of hydatid disease over a period of 20 years. Several clinically interesting cases are described.

R. T. L.

AFRICA (Candida M.) & STA. CRUZ (Juan Z.). *Cysticercus Cellulosae* **in Man.**—*Jl. Philippine Islands Med. Assoc.* 1927. June. Vol. 7. No. 6. pp. 209–215. [College of Med., Univ. of the Philippines.]

In the protocols of more than 12,000 autopsies performed in the Department of Pathology and Bacteriology in the University of the Philippines and covering a period of 19 years (1907–1926) only two cases of infestation of man with *Cysticercus cellulosae* are noted. The notes of these two cases are now printed. The authors state that a single case of cysticercosis was once encountered in a living subject in the Philippines. Among the Filipinos adult *T. solium* and *T. saginata* occur in the proportion of 1 to 7.

R. T. L.

SOUTHWELL (T.). **Experimental Infection of the Cat and the Fox with the Adult** *Echinococcus.*—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 155–163. [11 refs.]

Cases of infection with hydatid are much more common in man and domesticated animals in England than is generally recognized. At the same time the rarity of *Taenia echinococcus* in the dog has been remarked upon by various authorities. The author has shown that the fox and the cat can be infected experimentally with *T. echinococcus* by feeding these animals with hydatid cysts. The use of slaughter-house refuse on the land as manure may be a source of the infection in the fox.

R. T. L.

RACKEMANN (Francis M.) & STEVENS (Amos H.). **Skin Tests to Extracts of Echinococcus and Ascaris.**—*Jl. Immunology.* 1927. June. Vol. 13. No. 6. pp. 389–394. [10 refs.] [Massachusetts General Hosp.]

The skin reaction to echinococcus fluid and to ascaris extract which occurs in patients who have recently suffered from the infections is accompanied by "reagins" but not by "precipitins." Hypersensitiveness to ascaris is not uncommon and may be acute even in persons who give no indication of previous infection.

R. T. L.

ALCARAZ (Ramón A.). La obtención de suero positivo Ghedini-Ymaz-Lorentz, en los animales de laboratorio. [**Obtainment of Positive Serum for Control in Hydatid Test.**]—*Semana Méd.* 1927. June 9. Vol. 34. No. 23 (1743). pp. 1428–1429.

It is often difficult to obtain when it is needed a positive serum as a control in testing a possible case for hydatid infection by the method of fixation of complement. The author found that inoculation of the fluid from hydatid of sheep intravenously into rabbits yielded a potent serum, having a higher antigenic power than human hydatid fluid.

H. Harold Scott.

KING (G. E.). **Hydatid Disease.**—*China Med. Jl.* 1927. May. Vol. 41. No. 5. p. 457.

In view of the apparent rarity of Echinococcus infection in China these brief notes of operations on five cases of hydatid in man and the record of two other cases which refused operation are of interest.

R. T. L.

MAGATH (Thomas B.) & BROWN (Philip W.). **Standardized Method of treating Tapeworm Infestations in Man to recover the Head.**—*Jl. Amer. Med. Assoc.* 1927. May 14. Vol. 88. No. 20. pp. 1548–1549. With 1 text fig. [1 ref.]

The procedure recommended is a combination of various methods and consists of three essential steps. The patient should not have luncheon or supper on the day preceding treatment, but black coffee or tea and water may be taken freely. 15–30 gm. of magnesium sulphate is administered at 6 p.m. and repeated at 6 a.m. After the bowels have moved and without being given breakfast the patient receives 30 cc. of an emulsion containing oleoresin of aspidium, 6 cc. or gm., powdered acacia 8 gm., distilled water to make 60 cc. One hour later a second 30 cc. of emulsion is administered. This is followed two hours later by 30 gm. of magnesium sulphate and two hours after this a large soap-suds enema is given. If the patient has been properly prepared the stool should consist of little but water, a few shreds of digested food and a worm. The authors regard the enema as an extremely important part of the treatment and point out that a saline purge is essential instead of castor oil as aspidium is highly toxic and soluble in oil.

R. T. L.

ISOBE (Michi). **The Significance, Physicochemical Conditions and Pharmacological Studies on the Movement of the Hexacanth Embryo.**—*Acta Scholae Med. Univ. Imperialis in Kioto.* 1926. Vol. 8. No. 4. pp. 519–536. [5 refs.]

Grape sugar in 0·365 mol. solution and table salt in 0·172 mol. solution cause a vigorous motion in the Hexacanth embryo of Taenia, which, accompanied by extension and contraction of the body, may be sufficiently violent to burst the shell. On the other hand magnesium sulphate, which is frequently employed clinically as purgative and given daily in doses of 15 gm., makes a solution of over 1·04 mol. which renders the hatching of the embryo impossible. Diluted hydrochloric acid in a 1 per cent. solution gives a concentration of 0·03 mol. and this too is against the mechanism of freeing the embryo. The author is strongly of the opinion that the administration of this kind of drug can prevent infestation by *Hymenolepis diminuta*.

R. T. L.

CHANDLER (Asa C.). **The Distribution of Hymenolepis Infections in India, with a Discussion of its Epidemiological Significance.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 973–994. With 3 maps. [20 refs.]

By direct centrifugal flotation method Chandler has found *Hymenolepis nana* to be widespread in man in India. He discusses the epidemiological factors underlying the unequal distribution of *H. nana* infections as compared with the distribution of ascaris and whipworm in India. From an examination of 8,000 individuals from various parts of India he finds that in those localities where *H. nana* infections are rare or absent ascaris and whipworm infections are strikingly present. He points out that if *H. nana* in man were commonly derived from rats one would expect the infection to be common in all localities where plague is present; to be rare in all localities where plague is not present on account of conditions which do not favour rats; and to be common in localities where rats are numerous, though plague is rare on account of special climatic conditions adversely affecting growth of plague bacilli in fleas. He finds the distribution of *H. nana* infections so overwhelmingly close to that of plague that it is difficult to deny an underlying common epidemiological factor, which apparently is an abundance of rats in close association with man. He also points out that 19 out of 20 cases of *Hymenolepis diminuta* reported from man in India occur in areas where *H. nana* infection exceeds 3 per cent., while the one case came from an area where *H. nana* infections are below 1 per cent. This brings another epidemiological fact to support the theory of the rodent origin of *H. nana* infections in man.

R. T. L.

BRUNI (Enrico). La Tenia nana. I primi sette casi d'infestazione negli Abruzzi. [**Cases of** *Taenia nana* **Infestation in the Abruzzi.**]—*Ann. di Med. Nav. e Colon.* 1927. Mar.–Apr. Year 33 (Year 5). Vol. 1. No. 3–4. pp. 141–147. [57 refs.]

Between 1879 and 1923 the number of cases of *Taenia nana* infection recorded for Italy totalled 95. Of these 50 occurred in Sicily, 28 in Lombardy, 8 in Tuscany, 4 in Campania, 3 in Lazia, and 1 each in Venice and Piedmont. The author adds to these records seven cases of infestation in the Abruzzi, one of which he had published in 1923.

R. T. L.

JOYEUX (Ch.). *Diphyllobothrium mansoni* (Cobbold, 1883). (Note préliminaire). [*Diphyllobothrium mansoni.*]—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3. pp. 226–228.

Joyeux gives a preliminary account of the morphology of the adult of *Sparganum mansoni* and contrasts it with *D. reptans*, *D. decipiens* and *D. latum*. He believes it to be a valid species and promises a more detailed and illustrated account.

T. W. M. C.

KRAUSE (Esther). Contribution à l'étude du *Diphyllobothrium latum* (L.) en Palestine. Description d'anomalies chez ce cestode. [*D. latum* **in Palestine. Anomalous Specimen.**]—*Ann. Parasit. Humaine et Comparée.* 1927. July 1. Vol. 5. No. 3. pp. 249–251. With 1 fig. [4 refs.]

A specimen of *Diphyllobothrium latum* showing in its whole length of 10 metres 37 segments with fenestration. One of the large fenestrations extends over three segments. In the lake of Tiberius *Perca fluviatilis* and *Barbus sp.* occur. These species are known vectors of *D. latum.*

R. T. L.

CARMAN (J. A.) **A Case of Acute Intestinal Obstruction due to Taeniasis.**—*Kenya & East African Med. Jl.* 1927. Aug. Vol. 4. No. 5. pp. 152–153.

Until 16 hours before death from intestinal obstruction due to taeniasis practically no symptoms were noticed. At the post-mortem 7 tapeworms were found aggregating over 100 feet in length.

R. T. L.

HOEPPLI (R.). Ueber Beziehungen zwischen dem biologischen Verhalten parasitischer Nematoden und histologischen Reaktionen des Wirbeltierkörpers. [**Relations between the Biological Behaviour of Parasitic Nematodes and the Tissue Reactions of the Host.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Vol. 31. No. 3. pp. 207–290. With 24 figs. & 1 coloured plate.

The subject of this monograph is the investigation into the relations between the structure and mode of life of parasitic nematodes on the one hand, and the histological reactions on the part of the host on the other. Such records are scarce and for their accuracy depend very largely on the material being fixed as soon as possible after death; this the author was fortunate in being able to obtain.

The work is divided into four sections: In the first are considered the modes of attachment of various parasitic nematodes and the reaction by the hosts' tissues; in the second the tissue-changes set up by the manner in which the parasite acquires its nutriment; in the third, the histological reactions to wandering nematodes; and, lastly, the reaction to encapsulation.

The author shows, with illustrative examples, how the mode of attachment varies with the structure and form of the head. Nematodes which pass their adult life entirely within the body-tissues have but little need of organs of attachment; these are consequently absent or lowly developed, for instance in Filariae. Those which lie free, partly or wholly, behave differently according to their environment. When the space at the disposal of the parasite is so adapted that it can by its length and bodily formation gain attachment, a highly developed fixing apparatus is not present, as in *Rhabdias bufonis* and *Ascaris lumbricoides.* In 350 autopsies in man ascaris was always found lying free in the intestine; this does not necessarily prove that there was no attachment in life, but no signs were found of any wounds of the mucosa when the tissues were examined microscopically. The same remark applies to *Parascaris equorum.* With *Contracaecum* and *Anisakis* a crateriform dip was found in the mucosa and the base comprised a small necrotic area with surrounding eosinophilia; with *Tanqua tiara* the site of pressure was indented with pectinate markings, corresponding with the cuticular rings on the head of the worm, by which the parasite, as it were, anchored itself to the mucous membrane. *Porrocaecum* was found to penetrate deeply (in an American robin, *Turdus migratorius*) even to the serous coat. The canal contained torn off epithelial cells, singly or in groups, but there was no necrosis of the wall nor any inflammatory reaction. The deduction from this is that the penetration is probably a post-mortem feature, the worm burrowing more deeply as the bird's temperature fell after death.

In the case of *Tanqua tiara* the head is bulb-shaped and is seen to occupy a cavity having a narrowed outlet closely approximated to the pectinate tissue of the posterior part of the head, which is held in a sort of ball-and-socket joint, and the tissue adjacent at the summit of the head is necrotic. *Gnathostoma hispidum* showed a similar mode of attachment in the stomach of the pig. With some forms of *Physaloptera* the mucosa was indented and the surrounding tissue was oedematous, but there was no infiltration of it nor any necrosis; *Physaloptera turgida,* however, adhered more firmly, biting out sharply circumscribed fragments from the mucosa or gnawing away the superficial layers. Some worms, such as the Trichuroidea, have a long and narrow anterior end, suited for boring, and the whole acts as an attaching structure; others have a definite fixation-apparatus, as *Ancylostoma duodenale* and *Tanqua tiara.*

The effect of attachment is in part purely mechanical, though this may lead to reaction by the tissues of the host, as in *Gongylonema scutatum* in the oesophageal mucosa of the ox, and *Trichosoma* in the urinary bladder of the rat, and in part the result of chemicotoxic action by special secretions. One of the effects of the latter is a localized eosinophilia. This phenomenon depends on four factors: 1. The species of parasites; 2. The species of the host; 3. The nature of the host's tissues; 4. The virulence and duration of infection. It would appear that eosinophiles possess the property of taking up and destroying toxic substances.

Passing on to the question of the mode of obtaining nutriment. Some nematodes, e.g., *A. duodenale,* bite or tear off single cells or clumps of them, and thus obtain blood also; others, such as *Trichuris trichiura* reduce the adjacent tissue-cells to a fluid state and then absorb a more or less homogeneous material; *Contracaecum* and *Tanqua* employ both a mechanical action on the tissues and the effect of secreted substances, while *Rhabdias bufonis* is almost entirely a blood-sucker. Some, again, take up tissue-fluids or serum, with or without cells, a process analogous to osmosis, e.g., *Filariae;* while, finally, some obtain their nutriment from the intestinal contents of the host.

The reaction of the tissues to the wandering nematodes is the subject of an interesting section, illustrated by microphotographs of the changes induced. These changes are shown to be dual in nature, namely those resulting from the presence of the parasite as a mere foreign body, and those due to secretory products. The former has a considerable variation, for example, the presence of Ascaris larvae. These wander in the rabbit and the mouse as in man, but, in the liver of the rabbit little harm results, whereas in the mouse, with its smaller vessels, there is more or less destruction of the whole organ from blocking and rupture of vessels.

The final section on the histological changes resulting from encapsulation of nematodes consists of two parts; in the first those are dealt with which encyst in the mature, adult, stage, such as *Onchocerca volvulus, Spirocerca sanguinolenta, Habronema megastoma, Hepaticola hepatica,* and others; in the second the encapsulaton of larvae is described, as those of *Toxacara canis, Strongylus vulgaris, Trichinella spiralis.*

Want of space precludes us from giving details of this last section, which is important and instructive. The whole monograph is of the utmost interest from the point of view of comparative pathology, and the collection of facts is of the nature of pioneer work on the borders of a vast and little explored domain.

H. Harold Scott.

FÜLLEBORN (F.). Ueber das Verhalten der Larven von *Strongyloides stercoralis*, Hakenwürmern und *Ascaris lumbricoides* im Körper des Wirtes und ein Versuch, es biologisch zu deuten. [**Behaviour of Larvae of** *S. stercoralis*, **Hookworms and** *A. lumbricoides* **in the Host's Body. A Biological Explanation.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Vol. 31. No. 2. 56 pp. With 5 text figs. [39 refs.]

In a characteristicly detailed study, full of suggestive ideas, Professor Fülleborn has communicated his continued studies on the biology of the larvae of Strongyloides, hookworms and ascarids.

He finds that in the case of the larva of Strongyloides, its sojourn in the tissues of the host—whether under the skin or in the walls of the intestine—causes changes which are essential for its future and continued development.

Larvae of the dog hookworm (*Uncinaria stenocephala*) when fed to the proper host can penetrate into the ducts of the intestinal glands (as can also the larvae of the dog whipworm and of *Heterakis gallinae* of birds) from which, after some time, they re-emerge into the lumen of the alimentary canal to continue their development. After penetration of the skin, important morphological changes may occur in the lungs—development continuing as far as the formation of the provisional buccal capsule characteristic of the last larval stage and the formation of the new skin.

Fülleborn considers that the invasion of the glands in direct feeding may be a " philogenetic reminiscence " of a sojourn in the tissues which was an essential stage in the life history of some previous ancestor ; alternatively of an obligatory migration from the alimentary canal to the lungs. The continued development observed in the lungs following skin penetration supports the latter hypothesis. In abnormal hosts development does not proceed as far as the development of the provisional buccal capsule and only some of the larvae leave the intestine to complete the lung circuit.

He believes that the reason why the larvae of *Ascaris lumbricoides*, after feeding, cannot settle down in the gut, is because this species originally required an intermediate host (as is the case with the fish Ascarids) and that later the definitive host became the intermediate host as well—a form of development observed in other species of helminths. In order to reach the internal organs of the intermediate host, penetration of either the skin or gut wall is necessary. All larvae in the circulation must, from purely mechanical causes, reach the lungs and can be carried from there by the ciliated epithelium of the air passages to the oesophagus. The definitive host could accordingly be infected not only by larvae which had penetrated its own intestine and been transferred to the lungs, but also by eating an animal containing the corresponding stages of the larvae in its lungs. Similarly one of the many intermediate hosts of *Ascaris lumbricoides* might possibly have become a definitive host, the only possible method in non-flesh-eating hosts.

T. W. M. C.

BRANCH (Arnold) & GAY (D. M.). **Diarrhea in Monkeys (*Macacus rhesus*) with Oesophagostomum, Strongyloides and Trichomonas Infections.**—*Amer. Jl. Trop. Med.* 1927. Mar. Vol. 7. No. 2. pp. 97–110. With 6 text figs. [5 refs.]

Branch and Gay examined a batch of 45 monkeys (*Macacus rhesus*) suffering from a severe form of diarrhoea from which 20 died. Post-mortem examinations disclosed a mucous enterocolitis due apparently to *Oesophagostomum brumpti* and possibly aggravated by the presence of *Strongyloides fülleborni*. Lung lesions due to Ascarids were common. No therapeutic measures were found to be very effective, but transference to large sanitary cages which could easily be cleaned caused a striking change as re-infection from faeces had apparently been common.

T. W. M. C.

CONNOR (Frank). **A Plea for a Thorough Investigation of the Filariasis Problem.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 239–240.

Sir Frank Connor makes a strong plea for a full investigation of the problems associated with filarial infection in India. He lists the many apparent gaps in our knowledge and points out that the mortality from filariasis, though seldom direct, is probably enormous. Moreover, clinical evidence proves that the sick-rate involved, and therefore the industrial loss, is very high.

R. T. L.

YAMADA (Shin-Ichiro) & KOMORI (Kamewe). **From what Point of the Proboscis of the Mosquito do Developed Larvae of *Filaria bancrofti* escape?**—*Scientific Reports Govt. Inst. Infect. Dis. Tokyo.* 1926. Vol. 5. pp. 647–651. With 4 figs. on 1 plate. [9 refs.]

The authors have had no opportunity of observing the escape of filarial larvae from mosquitoes in the natural condition, but they have studied experimentally the escape of developed filarial larvae from the labium by rupturing the tip of the labella when a certain stimulus, such as pressure or heat, is experimentally given to them. They may also escape spontaneously in the same way when their hosts are fed on sugar solution. The tip of the labella lies just ahead of the path of the larvae and is easily ruptured by light pressure from outside or from within. In no case did they find filarial larvae escaping through Dutton's membrane.

R. T. L.

DALAL (Chimanlal M.). **The Treatment of Filarial Fever by Neosalvarsan.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 449–450.

Dalal has treated three patients suffering from filarial fever with injections of 0·6 gm. of neosalvarsan with encouraging results. After a single injection, each of the three cases became free from fever. The swelling of the glands, although somewhat reduced, persisted and the author inquires as to the best measures for treatment as to these swellings.

R. T. L.

KHAN (Kishori Mohan). **A Fatal Case associated with Filarial Infection.**—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. p. 147.

Khan records a fatal case in an adult male suggesting a septicaemia secondary to a filarial infection, but as no post-mortem examination took place the diagnosis was not confirmed. There were no symptoms other than fever (106·8° F.) but microfilariae were found in the blood.

R. T. L.

LOW (George C.). **Loa Loa Infection in Central Equatorial Africa.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 514–515. With 1 map in text.

This note gives a useful map of Africa showing three foci of *Loa loa* infection in the Haut Wellé and Ituri Provinces of the Belgian Congo. Mr. James TAYLOR, of the Heart of Africa Mission, is reported to have written to the effect that many cases occur among both whites and blacks at the Mission Stations of Niangara, Nala and Ibambi.

R. T. L.

SHARP (N. A. Dyce). **Development of** *Microfilaria perstans* **in** *Culicoides grahami*; **a Preliminary Note.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. July 11. Vol. 21. No. 1. p. 70.

The embryos of *Filaria perstans* ingested by *Culicoides grahami* undergo metamorphosis in the usual filaria manner up to the sausage-shaped body in the thoracic muscles. The completely metamorphosed larvae emerge from the neck of the fly later. About 3 per cent. of the wild flies are naturally infected at Mamfe, British Cameroons.

R. T. L.

ITAGAKI (Shiro) & MAKINO (Rokuro). **Studies on the Treatment of** *Microfilaria immitis* **Infection by Intravenous Injection of Natrium Antimonyl Tartarate.**—*Jl. Japan Soc. Vet. Sci.* 1927. Mar. Vol. 6. No. 1. English summary pp. 15–23. [In Japanese pp. 1–14. 9 refs.]

The intravenous injection of natrium antimonyl tartrate is claimed by the authors to have given satisfactory results by causing the disappearance of microfilaria from the peripheral blood of 17 dogs upon which it was tested. Nevertheless living adult worms were found after death. The drug appears also to have caused toxic symptoms in most cases.

R. T. L.

SHARP (N. A. Dyce). **Onchocerciasis.**—*Proc. Roy. Soc. Med.* 1927. Apr. Vol. 20. No. 6. pp. 927–937 (Sect. of Trop. Dis. & Parasit. pp. 41–51).

Although *Onchocerca volvulus* is commonly associated with tumours these are not essential and are only to be regarded as late manifestations of infection. The first sign of the disease is not a subcutaneous tumour but the existence of active embryos in and around the corium. At Kaduna, Northern Nigeria, the author found skin infection in 55 per cent., but tumours only in 30 per cent. The embryos are commonly found in the lymphatic glands, sometimes in enormous numbers. In the blood of 2,000 cases examined by thick film method, embryos occurred in 8 per cent. In hydrocele fluid they are often present. Tumours may simulate juxta-articular nodules, which the author declines to believe form a clinical entity and regards as the aftermath of a fibrous tumour caused by Onchocerca, spirochaetes or other organisms as a result of slight but prolonged irritation of the subcutaneous fascia. The author confirms OUZILLEAU in his association of Onchocerca with cases of elephantiasis. It is stated that a successful result followed the intravenous injection of a gold preparation B 1916 in a single case.

R. T. L.

BHACHECH (Pramodrai Motilal). **Guinea-Worm Infection; a Personal Experience.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. p. 450.

The author relates his personal experience of infection with guinea-worm. Two parasites appeared in the right lower extremity in 1908, and came out in pieces. In 1912 he removed an entire worm measuring 2½ feet from the left leg. Fifteen years later a worm appeared at the inner canthus of the left eye. After some days the worm began to extrude itself from near the supra-orbital foramen. This parasite was a small one, and only 3 inches in length; its appearance was not heralded by urticaria or fever as in the two previous instances.

R. T. L.

CAZANOVE (F.). Considérations sur la dracunculose et la filariose. [**Notes on Dracontiasis and Filariasis.**]—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 445–447.

The author has enquired into the histories of 469 soldiers in the 1st Senegalese Battalion of Algeria and finds 120 of them had had guineaworm. He concludes from a study of the geographical distribution of the cases that the lakes of the desert region are special centres of infection, and thinks that infection through the skin is the most plausible route. There are similarly distinct endemic foci for *Filaria bancrofti* which may be attributable to a special species of mosquito as the only efficient carrier in these regions.

R. T. L.

KURUHASHI (Tadashi). [**On a Case of** *Filaria medinensis* **occurring in Korea.**]—*Chosen Igakkwai Zasshi* (*Jl. Chosen Med. Soc.*). 1926. Oct. No. 68. [Summarized in *Japan Med. World.* 1927. May 15. Vol. 7. No. 5. pp. 145–146.]

A guineaworm about 200 millimetres long was removed from a patient from the city of Fusan in Korea. The patient also removed another worm from his foot. No similar case has been reported from this region.

R. T. L.

CHAIGNEAU (Y.). Sur le traitement de la dracunculose par la méthode de Tournier. [**Treatment of Dracontiasis by Tournier's Method.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 395–397. [1 ref.]

Five cases of dracontiasis treated by the native method of slow extraction required 20–87 days to cure, while in 17 cases treated by TOURNIER'S method with kermès the parasites were expelled in from 1 to 13 days.

R. T. L.

STAFFIERI (David), GIACOSA (Ramón A.) & BARRALT (Rómulo). La anguillulosis intestinal activa y latente. Consideraciones a propósito de tres nuevas observaciones. [**Strongyloidosis, Active and Latent. Three Fresh Cases.**]—*Semana Méd.* 1927. May 19. Vol. 34. No. 20 (1740). pp. 1212–1217. With 2 text figs.

The development of Strongyloides in the intestine is generally associated with an intense enteritis and may give rise to marked anaemia and occasionally fever. The author gives clinical observations on two cases of this infection.

R. T. L.

MANALANG (C.). **Observations on the Development of Ascaris Ova.**—*Philippine Jl. Sci.* 1927. July. Vol. 33. No. 3. pp. 249–255. [4 refs.]

Under experimental conditions the ova of *Ascaris lumbricoides* develop into motile larvae in from 9-15 days at room temperature. A temperature of 55° C. appears to prevent larval development. When dried on a glass slide and exposed to direct sunlight the ova failed to develop. When suspended in Kronecker fluid in a moist chamber and exposed to direct sunlight for 2 hours and longer, the ova showed no subsequent development. Kept for more than two weeks in a desiccator the ova showed attempts to larvate but did not become motile larvae. Anaerobic conditions appear to delay but not to inhibit development. The impermeability of the eggshell to high concentrations of salt, vinegar and sugar and various other substances is demonstrated by the author's experiments. The marked resistance of ascaris eggs to chemical substances seems to indicate that the most practical methods of prevention lie in proper sewage disposal and the periodic treatment of infected cases.

R. T. L.

SCHWENCK (J.). Rôle des cloportes en tant que porteurs d'oeufs de nématodes. [**Wood Lice as Carriers of Nematode Ova.**]—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 848–850.

In studying the parasitic fauna of wood-lice the author has frequently found bodies resembling the eggs of Toxocara. This led him to feed wood-lice experimentally on the dejecta of cats infested with roundworm. The experiments were repeated with human stool containing eggs of *Ascaris lumbricoides*. In both cases the faeces of the wood-lice contained viable eggs. A more detailed account of the investigation is promised.

R. T. L.

KOIDZUMI (Makoto). **A Résumé of Works on Ascaris recently published from the Parasitology Laboratory, Keio University Medical College.**—*Japan Med. World.* 1927. Jan. 15. Vol. 7. No. 1. pp. 12–16.

In a survey of the work on Ascaris done by his colleagues, Koidzumi draws attention to HIRAISHI's experiments in which he demonstrated that in the absence of vitamin A from the diet it was easy to infect pigs with both porcine and human strains of Ascaris, although the latter were never so plentiful as the former. Pigs fed on the same diet to which cod-liver oil had been added could not be infected.

Experimental studies on the pathogenesis of Ascaris infections showed that the products excreted by the worms kept in Ringer's solution caused a degeneration in the suprarenal glands. The coelomic fluid of the worm contains a substance which causes a lowering of the blood pressure, quickening of the heart and contraction of smooth muscle fibres. The changes in the suprarenals may be due to the lowering of the blood pressure.

He draws attention to the fact that the lung migrations of the worms may predispose to tuberculosis although the available experimental evidence does not support this belief.

T. W. M. C.

Hiraishi (Teiichi). [**Experimental Ascariasis of the Young Pigs with Special Reference to A-Avitaminosis.**]—*Kei-o Igaku* (*Jl. Kei-o Med. Soc.*) 1926. July. Vol. 6. No. 7. [Summarized in *Japan Med. World.* 1927. Mar. 15. Vol. 7. No. 3. pp 79–80.]

Hiraishi attempted to infect young pigs experimentally with ascaris. Out of 30 only 1 gave a positive result. He then tried animals with A-avitaminosis and obtained 89 per cent. and 100 per cent. in two series of experiments.

R. T. L.

Brown (Harold W.). **Human Ascaris as a Household Infection.**—*Jl. Parasit.* 1927. Mar. Vol. 13. No. 3. pp. 206–212. [7 refs.]

Ascaris ova have been found in a high percentage of the floors of huts and about the door yards in Penonomé, in the Republic of Panama, where human excrement is not used as a crop fertilizer and the sources of drinking water are apparently free from faecal pollution. Ascaris incidence in rural Panama varies from 40–90 per cent. of the population. Oxyuris ova were also isolated from the floor of one hut in which a child infested with this parasite was living.

R. T. L.

Walker (J. H. C.). *Ascaris lumbricoides* **in the Singapore Garrison.**—*Jl. Roy. Army Med. Corps.* 1927. July. Vol. 49. No. 1. pp. 49–53.

The Singapore garrison was found to be heavily infested with parasitic worms, chiefly *Ascaris lumbricoides.* In one battalion the incidence was 84·71 per cent. This high degree of infection was traced to the supply of uncooked vegetables, principally lettuce and spring onions, from local market gardens owned and managed by Chinese. Although the use of human nightsoil is forbidden by law it has proved very difficult to prevent. The faeces so used is generally stored for three weeks. This probably destroys the more delicate ova and cysts and gives the ascaris ova time to become mature. The paper concludes with clinical notes of the two worst cases of worm infection seen by Sir David Galloway during thirty years' experience in Singapore.

R. T. L.

AUGUSTINE (Donald L.). **Development in Prenatal Infestation of** *Belascaris.—Jl. Parasit.* 1927. June. Vol. 13. No. 4. pp. 256–259. [5 refs.] [Med. School & School of Pub. Health, Harvard.]

The development in the foetus of *Belascaris marginata* larvae in prenatal infestations is retarded until parturition, after which migration takes place from the liver and lungs to the intestines, where the adult stage is reached. The author's experiments suggest also an age immunity, and as *B. marginata* is considered a parasite of young dogs it is probable that the age of the bitch may be a factor in determining the number of worms in the new born litter.

R. T. L.

PAWAN (J. L.). **Another Case of Infection with** *Lagocheilascaris minor* **(Leiper).**—*Ann. Trop. Med. & Parasit.* 1927. Mar. 25. Vol. 21. No. 1. pp. 45–46. With 2 figs. on 1 plate. [1 ref.]

The patient, aged 19, had never left Trinidad. Eight years ago, an abcess developed on his neck and since then it had continued to discharge, healing in one part and breaking down in another with sinuses from which worms escape indistinguishable from specimens previously identified by LEIPER as *Lagocheilascaris minor.*

T. W. M. C.

LUDLOW (A. I.). **Surgical Aspects of** *Ascaris lumbricoides.—China Med. Jl.* 1927. Feb. Vol. 41. No. 2. pp. 134–141. [32 refs.]

*Ascaris lumbricoides* is one of the commonest parasites of man in Korea. The incidence in women is higher than in men, due probably to greater ignorance of hygienic matters and less medical attention rather than to greater exposure to infection. Different occupations show much uniformity in degree of infestation. This is due to the equal exposure to infection from : (1) the use of excreta of human and swine origin for fertilizer ; (2) the faecal contamination of : (*a*) vegetables, (*b*) of water, (*c*) of the hands and feet ; (3) the spread by insects and animals. In infections with the adult worm there may be many symptoms which simulate various surgical lesions, and unless there is some great contra-indication the author gives calomel and santonin as a routine to all surgical patients. Three illustrative cases are reported. The first was one of ileus, apparently caused by the irritant action of the Ascaris rather than by mechanical occlusion. The second was a case of intra-peritoneal abscess with the post-operative appearance of Ascaris through the drainage wound. In the third case there was general peritonitis with perforation of the ileum. During the year April, 1925–26, 207 of the 454 surgical patients treated in Severance Hospital, Seoul, were infected with Ascaris. Three cases of appendicitis, two of abdominal wall abscess with perforation at the umbilicus, all in children, and one case of Ascaris in a gall stone were observed. The author cautions that while ascariasis may resemble appendicitis, abdominal tuberculosis and post-operative peritonitis, serious lesions may be attributed to the parasite which in reality are due to other causes.

R. T. L.

FINALY (Rudolf). Over de beteekenis der ascariden voor de darmperforaties. [**Significance of Ascarids in Intestinal Perforation.**]—*Nederl. Tijdschr. v. Geneesk.* 1927. Aug. 6. 71st Year. 2nd Half, No. 6. pp. 598–602. [9 refs.] [St. Josef Hosp., Heerlen.]

Finaly quotes two cases in which an adult dead ascaris was found by operation, in a retroperitoneal sub-hepatic abscess and in the peritoneal cavity. Though no perforation of the intestine was found and no fistula followed the operation the author thinks that in both cases the worm must have perforated the healthy intestinal wall with subsequent healing of the minute perforation. The infectious material carried by the worm caused purulent infection in both cases, which probably brought about the death of the worm.

The transmigration of the human body by the larvae cannot afford the explanation, chiefly because the return to the intestinal tract is necessary for the further development of the larva (FÜLLEBORN).

W. J. Bais.

KANAGARAYER (K.). **Some Unusual Manifestations of Infection with** *Ascaris lumbricoides*.—*Malayan Med. Jl.* 1927. Mar. Vol. 2. No. 1. pp. 23–24.

On six occasions the author has found at autopsy Ascaris worms in abnormal situations. In one, a fatal case of amoebic dysentery the worm was in the peritoneal cavity, having apparently escaped through a perforated amoebic ulcer. In two instances the worms were found within the appendix; in two cases within the common duct, causing intense jaundice; and in one case within the pleural cavity, following a stab wound which perforated pleura, diaphragm and stomach. Ascariasis in the Tropics may closely simulate meningitis, cerebral malaria and abdominal tuberculosis and is recognized by most practitioners as a common source of fever.

R. T. L.

BAROOA (M.). **Two Cases of** *Ascaris lumbricoides* **Infection simulating Cholera.**—*Indian Med. Gaz.* 1927. July. Vol. 62. No. 7. p. 388.

Two cases with symptoms of choleraic diarrhoea were cured by santonin, which resulted in the evacuation of Ascaris.

R. T. L.

BANERJI (B. P.). **A Case of "Typho-Lumbricosis."**—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. pp. 146–147.

Banerji records the case of a child of four, which displayed symptoms closely simulating typhoid fever. There was no rise in temperature, however, and after the expulsion of six ascarids, recovery took place.

R. T. L.

AKAGI (Katsuo). [**On the Placental Infection of Ascaris.**]—*Chugai Iji-Shimpo* (*Internat. Med. Jl.*) 1926. Oct. Vol. 45. No. 20. [Summarized in *Japan Med. World.* 1927. Feb. 15. Vol. 7. No. 2. p. 46.]

Foetal infection by Ascaris and Ancylostoma has been experimentally proved to take place through the placenta. The infecting larvae were found wedged in the tissues of the foetal liver and lungs for a considerable period. After birth and the establishment of respiration the larvae migrate to other organs via the respiratory tract. The worms attain maturity within 21–25 days after birth of the host. The liver and lungs show simple haemorrhagic spots and cell infiltration.

R. T. L.

HIRAI (Masamoto). **[On the Numerical Relation between the Passed Eggs and the Number of the Infesting Worms in Ascariasis and Ancylostomiasis together with a Notice on the Method of Counting Parasites' Eggs.]**—*Kei-O Igaku* (*Jl. Kei-o Med. Soc.*) 1926. Aug. Vol. 6. No. 8. [Summarized in *Japan Med. World.* 1927. Mar. 15. Vol. 7. No. 3. pp. 80–81.]

Hirai has calculated that the approximate number of ascaris might be estimated from the following formula :—

$$\frac{\text{eggs per milligram} \times 100}{2770} = \text{No. of females and}$$

$$\text{No. of females} \times \frac{4{\cdot}5}{5{\cdot}5} = \text{No. of males.}$$

R. T. L.

DA COSTA (S. F. Gomes). De l'action de l'oxycamphre, de l'acide camphorique et de l'oxime du camphre sur les helminthes. **[Action of Camphor Derivatives on Helminths.]**—*C. R. Soc. Biol.* 1927. Apr. 1. Vol. 96. No. 12. pp. 883–885. [12 refs.]

Da Costa, continuing his *in vitro* experiments on Ascaris, finds that these three camphor derivatives are much less active than camphor. Oxycamphor is the most active and camphoric acid the least.

T. W. M. C.

DEL DUCA (Domenico). Santonina e Chenopodio. **[Santonin and Chenopodium.]**—*Policlinico.* Sez. Prat. 1927. June 27. Vol. 34. No. 26. pp. 925–926. [4 refs.]

The author gives a brief account of a child of 2½ years harbouring ascaris. He first gave santonin, 0·025 gm. with calomel and scammony, without any vermifugal effect. The child was very ill, apparently moribund. Coffee and oil of chenopodium [dose not stated] were given ; 348 worms were expelled and the patient rapidly recovered.

H. Harold Scott.

KOHGAME (Yoshiki) & ASADA (Junichi). **[A Study on the Nature of Ascaricidal Property of Santonin. Communication II.]**—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1926. Dec. No. 2501. [Summarized in *Japan Med. World.* 1927. Apr. 15. Vol. 7. No. 4. p. 115.]

The ascaricidal power of santonin is due to its combination with bile, for santonin and metabolic products of santonin have no lethal action. Normal bile has a certain ascaricidal power, but not so remarkable as santonin-bile. Santonin is ineffectual against ascaris in organs other than the intestine. The drug can be absorbed from the vagina and exercise ascaricidal action.

R. T. L.

SASAKI (Ryudo). **[On the Oscillation of Specific Gravity of the Ascaris Eggs which are Manifested by their Growth.]**—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1926. Dec. No. 2502. [Summarized in *Japan Med. World.* 1927. Apr. 15. Vol. 7. No. 4. p. 115.]

By Baume's scale the specific gravity of Ascaris eggs varied between 11·1 and 22·2. The less mature the eggs the heavier they were. Unfertilized were lighter than fertilized eggs.

R. T. L.

FERNÁN-NÚÑEZ (M.). **The Pathogenic Rôle of** *Trichocephalus dispar* (*Trichuris Trichiura*).—*Arch. Intern. Med.* 1927. July 15. Vol. 40. No. 1. pp. 46–57. [11 refs.] [Faculty of Med., Univ. of Madrid.]

In 90 per cent. of 512 patients who had whipworm eggs in their faeces there was a definite eosinophilia of more than 4 per cent. and averaging about 12 per cent. In 10 out of 16 autopsies on labourers dying from various causes in Colombia whipworms were present in the caecum and in two cases in the appendix. Ten out of 100 reported cases of appendicitis were due to infection with whipworm alone. In the Magdalena river valley of Colombia 41 per cent. of 1,336 persons examined harboured whipworm. Approximately 30 per cent. of cases commonly diagnosed in tropical America as amoebic dysentery are of whipworm origin. Purpura haemorrhagica, acrocyanosis dystrophica, pernicious anaemia, urticaria and goitre may be associated with infestation. As whipworm is associated with hookworm in 33 per cent. of all cases in the tropics and as hookworm treatment is often ineffective against whipworm the campaigns against hookworm cannot be considered entirely effectual unless attention is given to the elimination of whipworm.

R. T. L.

LIEB (Clarence W.). **The Successful Treatment of Resistant Whipworm Infestation with Observations on Overlooked Symptoms.**—*Amer. Jl. Med. Sci.* 1927. Apr. Vol. 173. No. 4. pp. 523–526. [2 refs.]

In eleven cases of whipworm infection studied, the author observed that nervous symptoms were common to all. In seven urticaria had occurred, two showed a curious erythema on face and chest and all exhibited marked pallor. There was marked tympany in most instances and caecal splash in every case. The author found whipworm eggs easily in 9 cases, but in the remaining 2 only after repeated examination by Barber's glycerine salt method. He gives an elaborate technique for treatment, 2 oz. of castor oil followed on four successive days by an enema of 2 litres of 5 per cent. solution of monohydrated sodium carbonate with 1 oz. of colloidal kaolin. One-ounce doses of kaolin are also given once daily on each of the four days. This is discontinued after the fourth day but the enema is continued for two days or more. After complete expulsion of the enema 8 oz. of crude oil are injected into the rectum.

R. T. L.

OGATA (Seiji). **[On the Destruction of Trichocephalus Ova by Heat.]**—*Chugai Iji-Shimpo* (*Internat. Med. Jl.*) 1926. Oct. Vol. 45. No. 19. [Summarized in *Japan Med. World.* 1927. Feb. 15. Vol. 7. No. 2. pp. 45–46.]

A temperature of 70° C. for one second, or 60° C. for two seconds, or 69° C. for ten seconds, or 55° C. for three minutes completely destroys the vitality of whipworm eggs. They can withstand a temperature of 45° C. for one hour.

R. T. L.

DINGMANN (Albert). Zur Behandlung der Oxyuriasis in der Kinderpraxis. **[Treatment of Oxyuriasis in Children.]**—*Deut. Med. Woch.* 1927. Apr. 8. Vol. 53. No. 15. p. 621.

Dingmann recommends " with absolute confidence " the use of *Gelonida Aluminii subacetici Nr.* 1. in the treatment of oxyuriasis in children.

R. T. L.

CHANDLER (Asa C.). **The Prevalence and Epidemiology of Hookworm and other Helminthic Infections in India. Part IX. North-West India (Punjab, Kashmir, Rajputana, North-West Frontier Province, Baluchistan and Sind).**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 955 972. With 1 map. [4 refs.]

A fairly high incidence of light infections with hookworm occurs along the north and east borders of the Punjab and a still lighter infection in the irrigated valley of the N.W. Frontier Province. Elsewhere throughout N.W. India the ordinary rural population is almost entirely free from hookworm infection. This is apparently due to the dryness of the climate. Ascaris and whipworm are also almost entirely absent, which suggests that these eggs are less resistant to heat and desiccation than is commonly believed. No less than one per cent. of the total population of this region appears to be infected with Trichostrongylus sp. Guinea worm is everywhere locally dependent on the presence of step wells or rain-water reservoirs (" tanks "). *Hymenolepis nana* is surprisingly common ; the incidence varies in different localities from 1–21 per cent. and is strikingly similar to the incidence of plague. It is pointed out that the increase of irrigation may enhance hookworm infection, which is everywhere practically negligible at the present time, but the preference of the people for dry places for defaecation makes it improbable that hookworm will become a serious disease in this region. He concludes by stating that education on the importance of protecting food from rodents would assist in reducing *H. nana* infections.

R. T. L.

CHANDLER (Asa C.). **The Prevalence and Epidemiology of Hookworm and other Helminthic Infections in India. Part X. Central India and Bombay (Central Provinces, Central India Agency and Gwalior, Bombay Presidency except Sind and Hyderabad). Part XI. Madras Presidency and Southern States.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 143–158. With 1 map. [4 refs.] ; pp. 159–180. With 1 map. [3 refs.]

There is a small area in the eastern part of the Central Provinces of India which has a moderate degree of infection with hookworm. In the southern part of the Konkan district of Bombay the infection is fairly high, but throughout the greater part of Central India and Bombay it is extremely low owing to climatic conditions, for the rainfall is too low and uncertain to permit infection to spread appreciably. Indiscriminate soil pollution is practically universal. The nature of the soil exercises a marked influence on the amount of infection. The black cotton soil of a large part of Central India is particularly unfavourable for hookworm larvae. Except on the southern Bombay coast ascaris and whipworm infections are also negligible. Guineaworm is locally common where step wells are used, especially in the Western States of the Central Indian Agency and in the Gujerat and Deccan division of Bombay. Sporadic cases of Trichostrongylus occur everywhere, as in other parts of India. A rhabditis-like egg was found in the stool in a case near Tharwar, but is not *Rhabditis hominis.* Heterodera eggs were found in many places, especially in Bombay.

R. T. L.

FISCHER (W. O.) & ORENSTEIN (A. J.). **Preliminary Report on Hookworm Infection in the Gold Mines of the Witwatersrand.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1927. Feb. Vol. 6. No. 7. pp. 1–10. With 3 plans.

Recent investigations have shown that hookworms are an important factor in mining, and the authors, after a review of the parasites, their prophylaxis and their therapeutics, consider the position in the Witwatersrand Gold Mines. Using the Willis technique, 25 per cent. of the East Coast natives and nearly 9 per cent. of the British South African natives were found to be infected. Samples of soil showed that all the mines examined were infected. Boots are not available for prophylaxis and practical steps should involve mass treatment of natives and prevention of soil pollution (which is difficult and costly). The former is considered to be the better method and all recruits should be treated with carbon tetrachloride at the recruiting depot. An effective latrine is described and its adoption and proper use recommended.

R. T. L.

FISCHER (W. O.) & ORENSTEIN (A. J.). **Hookworm Infection in the Gold Mines of the Witwatersrand.**—*Jl. Med. Assoc. S. Africa.* 1927. Apr. 9. Vol. 1. No. 7. pp. 158–163.

The investigation of the faeces of patients admitted to the City Deep Native Hospital showed a hookworm infection of 19 per cent. out of 638 examined. Marked anaemia was present in 9 cases and in only one did the general condition point definitely to a clinical diagnosis. The investigation of soil from four mines showed at least one sample infected with hookworm larvae.

R. T. L.

LE GAC. L'ankylostomiase au Ouadaï. [**Ankylostomiasis in Ouadaï (French Equatorial Africa)**].—*Ann. de Méd. et de Pharm. Colon.* 1927. Jan.–Feb.–Mar. Vol. 25. No. 1. pp. 123–126.

Of 900 persons examined 282, i.e., 31·3 per cent., were infested with hookworm. The species present was exclusively *Ancylostoma duodenale.* The author believes that *Necator americanus* does not occur in Ouadaï. Ankylostomiasis as a disease is seldom met with, those infected being simply carriers.

R. T. L.

HILL (Rolla B.). **The Amount and Distribution of Hookworm Infestation in Porto Rico.**—*Porto Rico Health Rev.* 1926. Sept. Vol. 2. No. 3. 8 pp. With 1 fig. [3 refs.]

In spite of the tremendous amount of work on hookworm control that has been carried out since 1899 in Porto Rico, little is known of the relative intensity of infestation in different parts of the island. Egg counts were made in 9 districts and from these it appears that Utuado, Aguada, Camuy and Moca have light infections, Manatí, Barceloneta and Florida have heavier, while Adjuntas and Morovis have the heaviest of all. The last group is in the interior of the island and the conditions there are described as appalling, the average infestation totalling over 500 worms. The infection begins early in life and at 4 years of age the average number of worms is estimated at about 100. It is suggested that the relative freedom of the coastal regions is due to better sanitary conditions, absence of coffee plantations and somewhat lesser rainfall. The studies indicate that hookworm disease is taking a tremendous toll of life and health as it did when it was first discovered by ASHFORD in 1899.

R. T. L.

Ōi (T.). **Intestinal Parasites of Japanese Immigrants in Eastern Formosa, especially the Distribution of the Hookworm.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa.*) 1927. Feb. No. 263. English summary p. 4. [In Japanese.]

Oi found that immigrants in Formosa were infested with intestinal parasites, especially hookworm. He believes that the latter have some influence on outbreaks of blackwater fever. Children and women suffer more from a moderate infection with hookworms than do adult males.

T. W. M. C.

OZOUX (M.). L'ankylostomiase à la Réunion. [**Ankylostomiasis in Réunion.**]—*Rev. d' Hyg. et de Méd. Préventive.* 1927. May. Vol. 49. No. 5. pp. 362–365.

The author has found a case of hookworm in the Island of Réunion, but his stay there has been too short to obtain evidence as to the species.

R. T. L.

OISO (T.) & KAWANISHI (K.). **Experimental Supplement on Oral Infection with Ankylostoma, especially with the Young Larvae.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1927. July. No. 268. English summary pp. 1–2. [In Japanese.] [Govt. Med. Coll., Taihoku, Formosa.]

Following ASADA's procedure the upper part of the small intestine was ligatured in 16 pups and below this point mature hookworm larvae and young larvae were introduced. A pup was also infected directly through the mouth. In another pup the upper part of the small intestine was disconnected, larvae were introduced into the lumen and the two ends then sutured together. The ends of the upper and lower intestine were sutured to restore the connexion. The authors observed the following results. The majority of hookworm larvae introduced directly into the intestine are found in that part, others are found in the mucous membrane. If mature *A. caninum* larvae are introduced directly into the intestinal canal of the proper host, i.e., dog, they develop further. When introduced through the mouth or directly by operation into the intestines very young larvae are almost all destroyed and discharged, but the larvae in the earlier encysted period may develop further in the intestine of the natural host without undergoing the migration deemed necessary by ASADA.

R. T. L.

SHIRAI (Mitsuji). **Experimental Studies on the Oral Infection of Hookworm: with Special Reference to the Migration of Larvae in Body of Host.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 621–632. With 12 figs. on 2 plates. [8 refs.]

From experimental studies on dogs and rabbits it is shown that hookworm larvae are able to invade the mucosa of the oesophagus and intestine. They can also easily pass through the mucosa of the oral cavity and pharynx. The larvae can also pass through the wall of the alimentary canal and within 24 hours can be found in the abdominal cavity, liver, trachea and oesophagus.

R. T. L.

MANALANG (C.). **Ancylostomiasis: Relation between Number of Ova per Gram of Formed Stool and Number of Female Worms harbored by the Host, I and II.**—*Philippine Jl. Sci.* 1927. May. Vol. 33. No. 1. pp. 35–45. [9 refs.]; 47–65.

Part I. Manalang has studied 18 hospital patients intensively and finds that the series taken as a whole showed perfect correlation between the number of ova per gram of stool " formed basis " of " random " specimens and the number of females expelled, viz., 44 ova per gram per female. But taken individually the cases show variance from 26 ova per female to 100 ova per female.

Part II. A series of observations were made also on 18 fresh cadavers for the purpose of determining some of the causes of the discrepances noted between the number of hookworm ova per gram of formed stool and the number of female worms discharged, in a series of patients treated with chenopodium and controlled by Stoll's egg counting method. The author concludes that variability in egg output in cases with a large number of females may be due to their distribution in a long stretch of the small intestine, the contents of which, carrying a variable number of ova, failed to mix in their course to the rectum. The variability may be due also to mechanical influence such as faecal fistula and intestinal obstruction, stasis in the caecum or elsewhere, good or poor egg-laying females and egg destruction. It appears likely that different races or strains of necator have different egg-laying capacities.

R. T. L.

SOPER (Fred. L.). **The Relative Egg-Laying Function of** *Necator americanus* **and** *Ancylostoma duodenale.*—*Amer. Jl. Hyg.* 1927. Sept. Vol. 7. No. 5. pp. 542–560. With 6 text figs. [15 refs.] [Sch. of Hyg., Johns Hopkins Univ., Baltimore, Md.]

The average daily egg output of *Ancylostoma duodenale* is from 2–2½ times that of *Necator americanus* according to the method used by the author while investigating Paraguayan cases. The range of egg counts made on female worms is 0—1,120 for Necator, and 0—2,551 for Ancylostoma. Egg counts made on *A. caninum* secured at autopsy indicate that the variations found in counts are not due to medication or manipulation, but may reflect either irregularity in egg-laying or a cycle in egg production.

R. T. L.

VIDHIKAR (L. H.). **A Note on Charcoal Cultures for Hookworm Larvae.** *Jl. Parasit.* 1927. Mar. Vol. 13. No. 3. pp. 195–198. [4 refs.]

From the study of a series of carefully standardized cultures of hookworm larvae it was found that the best crops of larvae were secured from the nearly neutral human faeces alone. Blood charcoal proved superior to bone black (animal charcoal), while granular animal charcoal, willow wood charcoal and an acid-washed animal charcoal were distinctly inferior. Equal portions of stool and charcoal provided the optimum admixture.

R. T. L.

SVENSSON (Ruth M.). **Notes on Differences in Activity and Resistance between the Larvae of** *Ancylostoma duodenale* **and** *Necator americanus.*—*Jl. Parasit.* 1927. Mar. Vol. 13. No. 3. pp. 203–205. [5 refs.]

Preliminary experiments suggest that the larvae of *Necator americanus* are less resistant under different temperatures to drying than those of *Ancylostoma duodenale.* Necator larvae appear to have also a greater power of penetration through the skin.

R. T. L.

HEYDON (G. M.). **The Differences between the Infective Larvae of the Hookworms of Man.**—*Med. Jl. Australia.* 1927. Apr. 9. 14th Year. Vol. 1. No. 15. pp. 531–538. With 2 text figs. [6 refs.]

The author describes in detail the differences between the infective larvae of *Necator americanus* and *Ancylostoma duodenale.* As a result of his investigations he recommends as a routine differential diagnosis KORKE's measurement under a two-thirds of an inch objective of the distance from the oesophagus to the middle of the genital rudiments. This he states will separate the genera correctly in well over 95 per cent. of cases, provided the larvae have been suitably cultured and are well nourished. For absolute accuracy the buccal cavity should be examined.

R. T. L.

LANE (Clayton). **The Need for and Use of Controls in Hookworm Inquiries.**—*Jl. State Med.* 1927. Aug. Vol. 35. No. 8. pp. 458–473. [5 refs.]

Clayton Lane stresses the importance of controls applied separately to each separate factor in the study of ankylostome infections. The diagnostic techniques in use at present all adopt the floating principle, and those in general use are three in number, viz. Willis's direct gravity flotation technique, which mixes faeces with saturated salt solution, covers the vessel with a slide which after a time is removed for examination; Kofoid and Barber's indirect gravity flotation technique, which removes the top layer of a brine suspension by means of a loop of wire; and Lane's direct centrifugal flotation technique, which subjects the centrifugal precipitate of a watery suspension to centrifugal flotation, the mouth of the tube used being covered with a coverslip which is afterwards lifted off and examined for ova. The author summarizes the control count technique used by him to test the relative merits of these methods and shows that direct centrifugal flotation technique is by far the most accurate means at our disposal for the detection of hookworm infection. He points out the use of this technique in bringing into prominence the relative inefficiency of those lines of treatment which are relatively or actually safe, and its value as an aid in the search for an anthelmintic drug which will in a single dose eliminate all hookworms without risk to the host.

R. T. L.

FÜLLEBORN (F.). Zur "Hamburger Deckglasauszählung" für Hakenwurmeier. [**The Hamburg Coverglass Count for Hookworm Ova.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. pp. 232–236. With 3 text figs. [1 ref.]

Fülleborn, after much experiment with HUNG's method [*ante*, p. 195] advises the use of one gram instead of two grams of faeces as HUNG directs. The little boxes of copper plate can now be obtained with a depression in the base to hold one gram, and having a lid of tin plate which can also be used as a stand. These boxes are so cheap as to be suitable for mass diagnosis, and for this reason the lid is painted white, so that it may be written upon.

The calculation is made as in HUNG's method, except that the different quantity of faeces used must be borne in mind. When the number of eggs per gram of faeces is over 20,000, Fülleborn uses a method similar to that of counting red blood cells. The three coverglasses are laid in turn on a slide divided into millimetre squares; the number of eggs in ten of these squares is counted, and the average of the thirty squares taken. If fewer eggs are present they are counted in two-millimetre squares. The whole surface of the coverslip need only be counted if the eggs are scanty, and here use of the squared slide dispenses with the mechanical stage.

The slide can be very cheaply prepared from gelatin foil. This is laid on millimetre graph paper, and the squares traced by means of scratching on the mat surface of the foil with a sharp knife. The foil is then cleared in cedarwood oil, mounted in canada balsam on a large slide, and covered with a large coverslip. Another method is to use a previously fixed photographic film. The squares are drawn on paper, photographed (with suitable reduction), and then copied on to the film, which can be mounted as before. This latter method produces less finely marked lines, but is preferable when many such slides are required.

R. T. L.

CALDWELL (Fred C.) & CALDWELL (Elfreda L.). **The Effect of Sea-Water on the Development of Hookworm Ova and Larvae** (*Necator americanus*).—*Jl. Parasit.* 1927. June. Vol. 13. No. 4. pp. 270–282. [18 refs.]

Sea-water retards the hatching of hookworm embryos and swiftly kills newly-hatched larvae although it does not prevent the development of the ova to the embryo stage. Under optimum cultural conditions the lethal action of sea-water was demonstrated by an average larval yield of 0·116 per cent. in contrast with 67·6 per cent. from cultures moistened with tap-water. The larval yield from faeces containing viable hookworm eggs submerged under sea-water for more than one day and transferred thereafter to favourable conditions averaged only 0·75 per cent. These experimental results explain the findings in a field survey made in Panama, which showed that of the San Blas Indians who habitually defaecate directly into the sea below low tide, only 4·7 per cent. harbour hookworm in contrast with 82·3 per cent. among Indians in the interior and 89 per cent. in a non-Indian village where soil pollution is the rule.

R. T. L.

MANALANG (C.). **Effect of Carbon Tetrachloride, Chenopodium, and Thymol on the Ova of Expelled Hookworms.**—*Philippine Jl. Sci.* 1927. Apr. Vol. 32. No. 4. pp. 507–511.

The eggs recovered from female ancylostomes expelled with carbon tetrachloride failed to develop into active larvae, while those expelled by chenopodium and thymol showed active larval development. This ovicidal property of carbon tetrachloride strengthens its superiority as a treatment for ankylostomiasis. Tetrachlorethylene is similarly ovicidal. The author suggests the use of some inert porous powdered solid as a vehicle for anthelmintics. This would mechanically prevent fusion of solid drugs. Charcoal or chalk would probably serve.

R. T. L.

SCHAPIRO (Louis) & STOLL (Norman R.). **Preliminary Note on the Anthelmintic Value of Tetrachlorethylene based on Egg Counts before and after One Treatment.**—*Amer. Jl. Trop. Med.* 1927. May. Vol. 7. No. 3. pp. 193–198. [3 refs.]

Test treatment on 14 cases showed that tetrachlorethylene reduces the hookworm egg output by 93 per cent. when 3 cc. are administered and by 88 per cent. after 2 cc. The drug is more active in reducing whipworm egg counts than oil of chenopodium. The promising results merit further test with acid and neutral tetrachlorethylene.

R. T. L.

RICE (E. Milford). **Mass Treatment for Hookworm Infection on Tea Estates in Assam.**—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. pp. 126–129.

Rice recommends that mass treatment of hookworms in Assam tea estates should be given in February and March, administering to adults 60 min. doses of carbon tetrachloride in one ounce of magnesium sulphate after the morning meal. New arrivals are generally infected and should be treated on arrival. This routine decreases the number of infected and makes heavy infestations harmless. He draws attention to the part played in the dissemination of human hookworm eggs and larvae by cattle, pigs and dogs feeding on human stools.

T. W. M. C.

STEKHOVEN, Jr. (J. H. Schuurmans). Het derde larvenstadium van *Anchylostoma duodenale* Dub. [**The Third Larval Stage of** *A. duodenale*.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 3. pp. 479–480. With 1 fig. [1 ref.]

The infective larva of *A. duodenale* shows more resemblance to *Necator americanus* than to *A. caninum.*

The head is provided with lips, the amphids are like those of *A. caninum*, the amphidial sac is large, the tube shaped part of the amphid is directed inward, so that the fore parts of the amphids form a right angle. The mouth is armed with sickle-shaped hooks, as in Necator, but the ends are not parallel to each other, the oesophageal glands more pronounced than in *A. caninum;* its bulbus has marked rings and lobular glands. Near the opening of the subventral glands the glandular tissue is more developed than in *A. caninum.* The contrast between the sphincter and the bulbus of the oesophagus is not marked. The intestinal sphincter and the excretory organs are as in Ancylostoma, the tail is like *A. caninum*, but the termination of the sheath as in the Necator larva.

W. J. Bais.

STEKHOVEN, Jr. (J. H. Schuurmans). **The Nemas Anchylostoma and Necator.**—*Koninklijke Akademie van Wetenschappen te Amsterdam. Proceedings.* Vol. 30. No. 1. pp. 113–125. With 33 text figs. [10 refs.]

Differences between the 3rd stage larvae of *Ancylostoma caninum* and *Necator americanus* were found mainly in the structure of the head. in the covering on the apical end of the oesophagus, and the presence or absence of the anterior oesophageal bulb, in the structure of the posterior bulb, in the oesophageal glands, in the sphincter between oesophagus and intestine, in the shape and structure of the excretory apparatus, the shape of the tail and the distribution of the transverse striations on the skin. A series of clear high-power text figures illustrate the text.

R. T. L.

STEKHOVEN, Jr. (J. H. Schuurmans). Anchylostoma en Necator. [**Ancylostoma and Necator.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 2. pp. 223–225.

The author sets out in tabular form the microscopical characters by which the larvae of *Necator americanus* and *Ancylostoma caninum* can be differentiated.

R. T. L.

TSUNASHIMA (Yoshito). [**On the Function of the Thyroid in Ancylostomiasis.**]—*Okayama Igakkwai Zasshi* (*Jl. Okayama Med. Soc.*). 1920. Dec. No. 443. [Summarized in *Japan Med. World.* 1927. June 15. Vol. 7. No. 6. p. 179.]

Kottmann's test is retarded in diseases with increased function of the thyroid. It is of interest to note that this occurs in cases of ankylostomiasis which did not show advanced anaemia, while in cases in which the anaemia was far advanced the action developed more rapidly than normal.

R. T. L.

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**SCRIABINE (C. J.), PODYAPOLSKAYA (V. P.) & SCHOULTZ. L'autopsie helminthologique comme procédé précis pour l'étude de la faune helminthique chez l'homme.—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 5. French summary pp. 328–329. [In Russian pp. 270–283. 37 refs.]**

# TROPICAL OPHTHALMOLOGY: A REVIEW OF RECENT ARTICLES.—VIII*

CONJUNCTIVA.—*Spring Catarrh.* WOOD[1] considers that a calcium deficiency in the blood may be an important factor in spring catarrh and in malignant myopia. He suggests that spring catarrh might be defined as a reaction to climatic conditions, such as dryness, heat and dust, in young children subject to a deficient calcium content in the blood. He found that young patients suffering from the pericorneal type of the disease could be cured in three weeks by the use of calcium. Lid disease is more refractory; but there, too, calcium treatment is of service. Experience proved to him the value of small doses of parathyroid extract administered with the calcium salts. The association of conical cornea with spring catarrh suggests to him that the same aetiological factor may be present in both diseases. He found a calcium deficiency in every case of malignant myopia which was examined sufficiently early.

The connexion existing between chronic conjunctival inflammations and disorders of the skin or general constitution is easy to overlook and is perhaps sometimes neglected. COLE[2] relates his personal experience of an attack of conjunctivitis which lasted with slight remissions for about sixteen months. He tried various lines of treatment without success, but eventually came to the conclusion that he was a seborrhoeic subject and treated himself on these lines with immediate relief. He washed his scalp daily with sphagnol soap 15 per cent., and applied a lotion of salicylic acid grains 30, spirit of rosemary one drachm, castor oil two drachms and rectified spirit to one ounce every night to the eyelid.

*Trachoma.* TALBOT[3] states that trachoma is endemic in the northern and central parts of the Cameroons. Forest areas are completely free. But the distribution of the disease, though it apparently follows geographical lines, is unaffected by soil and climatic causes and is altogether due to racial factors. The Mohammedans and half-breeds suffer whilst the negroes escape. Nico DASCALOPOULOS[4], owing to his position as chief of the military ophthalmological department at Athens, has had an exceptional opportunity to study the distribution of the disease in Greece. He is of opinion that it occurs more or less all over the country and that its incidence has been influenced by the flow of immigrants from Egypt and Asia Minor. LUTRARIO[5] describes the world-wide distribution of trachoma and the mischief wrought by the disease. He recommends education of the public in hygiene and a popular recognition of the fact that any abnormal discharge from the eyes requires immediate attention. Notification, though beneficial in some respects, is, perhaps, best restricted to schools and similar communities ; otherwise it tends to make sufferers conceal their ailment. Early cases should be afforded every facility for outpatient treatment in clinics, and special attention should be paid to the inspection of schools. The disease appears to be on the decrease in Uruguay. MEERHOFF[6] notes a decline during the past thirty years in the ratio of the general population affected from 1·83 to 0·60. From POSEY'S[7] observations amongst the Indians of Oklahoma compulsory education has not proved an unmixed blessing, since the boarding schools, into which the Indian youths who live remote from an educational centre are collected, serve as foci of trachoma infection. The incidence is said to be as high as 25 per cent. amongst the Navajo and Pueblo tribes, most of the cases being in the cicatricial stage. The adult Indians live under bad hygienic conditions which favour the spread of the disease. To raise the standard of living and education to that of the white population is the best method of controlling the plague. The deplorable condition of Russia as regards the prevalence of trachoma has already been noted by DEAR[8] (this *Bulletin*, Vol. 23, p. 922). TCHIRKVOSKI[9] furnishes additional evidence. In 1913, 83 per cent. of the families in the Chouvash Republic were infected ; and in 1923 the proportion had risen to 95 per cent. The spread of the disease is not due to any anatomical peculiarity in the eyes of the victims, but to the social conditions under which they live. Steps have been taken to deal with the plague by affording facilities to train oculists and by organizing travelling missions to treat and educate the population. Lack of resources and of trained doctors and the low cultural standard of the people hinder progress, but it is hoped that the constant efforts made may eventually prove successful in subduing the disease.

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*For the seventh of this series see Vol. 24, pp. 472—482.

[1] WOOD (D. J.). Calcium Deficiency in the Blood with Reference to Spring Catarrh and Malignant Myopia.—*Brit. Jl. Ophthalm.* 1927. May. Vol. 11. No. 5. pp. 224–230.

[2] COLE (Arthur F.). Personal Experience of Chronic Diphtheroid Infection of Eyelid. [Correspondence.]—*Brit. Jl. Ophthalm.* 1927. Aug. Vol. 11. No. 8. pp. 413–415.

[3] TALBOT. Trachome dans le Cameroun sous mandat français.—*Revue Internat. du Trachome.* 1927. Apr. Vol. 4. No. 2. pp. 51–54.

[4] DASCALOPOULOS (Nico). Carte de la distribution géographique du trachome en Grèce.—*Revue Internat. du Trachome.* 1927. Apr. Vol. 4. No. 2. pp. 62–67. With 1 map in text.

[5] LUTRARIO (Albert). Enquête sur le trachome.—*Bull. Office Internat. d'Hyg. Publique.* 1927. Mar. Vol. 19. No. 3. pp. 310–325. [1 ref.]

IBAÑEZ PUIGGARI[10], FUCHS (Ernesto) FERRO & CRAMER[11] have written on conditions in Buenos Aires district of South America. Trachoma appears to be widespread in the industrial centres, and in those areas where insanitary conditions prevail. The fact that about 40 per cent. of the cases were in the cicatricial stage shows that the danger is a real one. CALAMATTA[12] regards the disease as a veritable scourge in the Tucuman Province, and appeals to the authorities to deal with it in earnest by establishing trachoma dispensaries and by building suitable annexes to the existing hospitals. Malaria, tuberculosis, poverty and alcoholism are associated evils in the province.

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[6] MEERHOFF (W.). [Trachoma in Uruguay 1894–1925.]—*An Facul. de Med.* Montevideo. 1926. Aug. Vol. 11. p. 521. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Apr. 23. Vol. 88. No. 17. p. 1359]

[7] POSEY (William Campbell). Trachoma among the Indians of the Southwest.—*Jl. Amer. Med. Assoc.* 1927. May 21. Vol. 88. No. 21. pp.1618–1619.

[8] DEAR (W. R.). Trachoma in Russia.—*Milit. Surgeon.* 1926. June. Vol. 58. No. 6. pp. 611–619. With 3 figs.

[9] TCHIRKOVSKI. Court aperçu de la propagation du trachome dans la région moyenne du Volga de l'U.R.S.S. et des mesures prises pour le combattre. —*Revue Internat. du Trachome.* 1927. Jan. Vol. 4. No. 1. pp. 8–18.

[10] IBAÑEZ PUIGGARI (Miguel). El tracoma en el interior de la Republica. Informe al Sr. Presidente del Departamento Nacional de Higiene, Dr. Gregorio Aráoz Alfaro.—*Semana Méd.* 1927. June 23. Vol. 34. No. 25 (1745). pp. 1531–1534.

[11] FUCHS (Ernesto), FERRO, PUIGGARI (Ibañez) & CRAMER (Bernasconi). El problema del tracoma en el pais. Informe elevado a la presidencia del Departamento.—*Semana Méd.* 1927. Aug. 11. Vol. 34. No. 32 (1752). pp. 386–387. [National Dept. of Hyg. Buenos Aires.]

[12] CALAMATTA (Domingo). Plan de lucha antitracomosa en la Provincia de Tucumán.—*Semana Méd.* 1927. Aug. 4. Vol. 34. No. 31 (1751). pp. 295–298.

NOGUCHI[13] reports that he has succeeded in isolating a micro-organism from five cases of trachoma occurring in pupils of the Albuquerque Indian school, New Mexico. The micro-organism induced in Macacus rhesus monkeys and in the chimpanzee a chronic granular conjunctivitis resembling that observed in the patients from whom the culture was obtained. It is a minute, Gram-negative, apparently non-motile, pleomorphic bacilliform organism which grows on a semi-solid medium containing fresh animal serum and haemoglobin, but fails to do so on any of the ordinary culture media, and only occasionally grows on blood-agar. Of twelve monkeys inoculated, eight, in from two to four weeks, developed a slowly progressive chronic granular conjunctivitis which resembled trachoma in the character of the lesions and in their localization. Scar formation occurred in one monkey seven months after inoculation. Four out of a second batch of nine monkeys inoculated from those first infected developed similar changes.

An account of trachoma in relation to other conjunctival diseases seen during the years 1924 and 1925 at the Jassy hospital in Roumania is given by Elena PUSCARIU[14]. 760 cases of conjunctival disease, representing 20·6 per cent. of the total, were seen during the period. Trachoma accounted for 72 per cent. ; diplo-bacillary conjunctivitis for 17 per cent. ; Koch-Weeks for 1·0 per cent. ; and follicular for 0·5 per cent. Phlyctenular kerato-conjunctivitis is said to have been the most common secondary condition. Follicular conjunctivitis appears to be remarkably rare and only four cases of it seem to have been encountered during the two years. Twelve patients were treated for entropion during the period.

NICOLLE and LUMBROSO[15] have caused in man a granular form of conjunctival inflammation by the inoculation of material obtained from rabbits suffering from the "natural" variety of the disease. The attack followed exactly the same course as it does in the case of the Algerian baboon. After a long incubation period of about two months the inflammation appeared in the conjunctiva of the lower lid and after some delay extended to that of the upper lid. It was found possible to produce the disease with a filtered virus. NICOLLE[16] has given some further particulars about this disease. It occurs in rabbits soon after birth and first shows itself by the appearance of scattered granulations. These subside later but plaques of follicular tissue persist at the outer and inner angles. The lower lid is principally affected, but a general dissemination can always be reproduced by a simple scarification of the conjunctiva. NICOLLE attributes the disease to an infection from the soil and states that it is quite distinct from true trachoma.

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[13] NOGUCHI (Hideyo). Experimental Studies of Trachoma. [Abstract.]—*Bull. New York Acad. Med.* 1927. June. Vol. 3. No. 6. pp. 395–399.

[14] PUSCARIU (Elena) & LAZARESCO (Eugénie). Le trachome pendant les années 1924 et 1925 à la clinique des maladies des yeux de la faculté de médecine de Jassy (Roumanie).—*Revue Internat. du Trachome.* 1927. Jan. Vol. 4. No. 1. pp. 29–39. With 3 text figs.

[15] NICOLLE (Charles) & LUMBROSO (U.). Nouvelle contribution à la connaissance de la conjonctivite granuleuse naturelle du lapin.—*C. R. Acad. Sci.* 1927. May 2. Vol. 184. No. 18. pp. 1031–1032.

[16] NICOLLE (Charles). La conjonctivite granuleuse du lapin et l'origine du trachome.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. .2 No. 14, 15 & 16. pp. 243–245.

T. A. LEA[17] reports that he has found acetic acid useful in the treatment of trachoma. After washing out the eye with boracic acid and instilling cocaine, he pricks each granulation with a tattooing needle previously dipped in acetic acid which has been diluted by the addition of an equal part of water. The conjunctiva is then washed again and cold compresses are applied to the lids. The treatment is repeated two or three times a week. Hypertrophied papillae are touched with sulphate of copper or with a 2 per cent. solution of silver nitrate. ABADIE[18] highly praises the efficacy of BLAIZOT's anti-gonococcal serum in the treatment of gonorrhoeal ophthalmia and blenorrhoea neonatorum, and thinks its use should be extended in countries where these diseases are rife. He suggests, too, that the remedy should be given a trial in obstinate cases of trachoma. He makes a useful protest against the common practice of directing all treatment in trachoma towards the destruction of the " granulations." These merely signify the presence of an unknown infective agent. He relates particulars of a case of pannus crassus in which he induced an attack of gonorrhoeal ophthalmia and secured a remarkable cure in consequence.

An historical account of this form of treatment is furnished by L. BERTHELOT[19] who records that JOEGER of Vienna was the first to use it in the year 1812. This may be correct, but one must remember that for ages past urine has in many countries been favourably regarded as an eye lotion by the itinerant quack. Possibly it owes its reputation to an occasional cure of pannus by an attack of gonorrhoeal ophthalmia. The reviewer has often seen various diseases of the eye complicated by a gonorrhoeal ophthalmia which had followed the application of virgin's urine as a collyrium. Evidently a mistake had been made in dispensing the prescription! Chaulmoogra oil as a remedy for the disease has been tried by MORAX[20], by LUSSICH-MATKOVICH[21] and by GABRIELIDÈS[22]. The reports show that the remedy, though not a specific, is a useful one, especially where pannus is present. It has no injurious action on the corneal epithelium, and causes very little pain. Grattage is required in order to secure its penetration. It is best used in combination with the more established methods of treatment. COLLIN[23] recommends the use of an ethyl chloride spray instead of carbon dioxide snow when the latter cannot be easily procured. The cornea is well protected by a spatula wrapped in gauze, and a fine spray played on to the surface of that part of the conjunctiva which it is desired to treat. Two or three treatments may be given at a sitting if an interval of some minutes is left between each.

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[17] LEA (J. A.). Treatment of Trachoma by Acetic Acid.—*Brit. Jl. Ophthalm.* 1927. Apr. Vol. 11. No. 4. pp. 150–152.

[18] ABADIE. Considérations sur le traitement du trachome.—*Revue Internat. du Trachome.* 1927. Apr. Vol. 4. No. 2. pp. 43–47.

[19] BERTHELOT (Louis). [Résumé of Thesis.] Bibliothèque de la Faculté de Médecine de Paris, 1800, no. 31, volume 3. Du traitement du pannus par l'inoculation blennorraggique envisagée particulièrement en France.—*Revue Internat. du Trachome.* 1927. Apr. Vol. 4. No. 2. pp. 47–51.

[20] MORAX (V.). Trachome unilatéral de l'adulte. Traitement par l'huile de chaulmoogra.—*Revue Internat. du Trachome.* 1927. July. Vol. 4. No. 3. pp. 74–79.

[21] LUSSICH-MATKOVICH (V.). Discussion of Morax.—*Revue Internat. du Trachome.* 1927. July. Vol. 4. No. 3. p. 79.

[22] GABRIELIDÈS (C.). Traitement du trachome par l'huile de chaulmoogra.—*Revue Internat. du Trachome.* 1927. July. Vol. 4. No. 3. pp. 80–85. [1 ref.]

[23] COLLIN (Léon). L'action du froid dans le trachome.—*Ann. de Méd. et de Pharm. Colon.* 1927. Jan.–Feb.–Mar. Vol. 25. No. 1. pp. 131–134.

The case recorded by Jean SEDAN[24] suggests that trachoma may on rare occasions prove a blessing in disguise. A man, suffering from trachoma with pannus, when working in a soap factory, was splashed over his face and eyes with a quantity of strong caustic soda solution. Much injury resulted, but the sight of the eye more affected by pannus was saved owing to the vascularity of the cornea.

UVEA.—*Cyclitis Artefacta.* LESTAGE & SOULOUMIAC[25] investigating a mysterious epidemic of conjunctival inflammation and cyclitis, which occurred amongst sailors on some French cruisers, found that a solution of " grains de Val " was capable of producing similar symptoms to those of the sufferers if instilled into the conjunctival sac. " Grains de Val " are composed of aloes 10 parts, podophyllin 1 part, and extract cascara sagrada 10 parts. An acute inflammation with circumcorneal injection, tenderness and lowered ocular tension occurs about 36 hours after an instillation of the drug. Recovery takes place in about four or five days. As in most of such cases the lower part of the cornea and the conjunctiva lining the lower lid were chiefly affected.

LENS.—KIRBY[26] has successfully cultivated lens epithelium *in vitro*· He employed the method and technique of CARREL in his experiments· The eyes of chick embryos, incubated for five days at 37·5° C., were found the most suitable; before and after this age it is almost impossible to remove the lens quite free from contamination by adherent cells of other tissues. After removal from the embryonic eye the lens is incubated for twenty-four hours at 37·5° C. It is then removed from the medium and incised anteriorly. The lens epithelium is stripped off as far as the equatorial region, and, on the point of a needle, is implanted into the embryonic juice plasma clot medium. Proliferation and migration occur from twelve to twenty-four hours later. Explants of lens cortex, however, fail to grow under these conditions. One strain of lens epithelium was cultivated *in vitro* through seventeen generations during a period of six weeks.

*Cataract.* CRUICKSHANK[27] has had an opportunity of examining the progress of cases operated on during 1923–4–5 at HOLLAND'S clinic at Shikarpur and has analysed the results in an interesting paper. 90·3 per cent. of the operations were by Smith's method, 5·3 per cent. by Barraquer's, and in 4·3 per cent. the capsulotomy operation was performed. Vitreous escape occurred in 10 per cent. of the cases and iris prolapse, including iris incarceration, in 11 per cent. The percentage of sepsis was 1·5. The figures suggest that vitreous escape occurred more frequently in cases subjected to a complete iridectomy; none took place in 144 patients on whom a marginal iridectomy was performed. 650 cases with complete iridectomy show 13 per cent. of vitreous loss, whilst 600 cases with marginal, peripheral, or no iridectomy show 6 per cent. An analysis of 1,294 operations shows a considerably higher rate of iris prolapse amongst 650 patients on whom a complete iridectomy was performed than among those on whom the iridectomy was partial or omitted. CRUICKSHANK says that "if Barraquer's technique is followed, the eye being well under the influence of atropine, and the lens tumbled," an iridectomy is not essential. The complication of choroidal haemorrhage was encountered very frequently—in 1·3 per cent. A high incidence of glaucoma in the district is blamed for this; and the routine use of the tonometer has led to a decrease in the number of expulsive haemorrhages. The author does not, however, discuss the possible influence of the intracapsular operation upon the complication.

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[24] SÉDAN (Jean). Pannus trachomateux ayant protégé la cornée dans un cas de brulure par soude caustique (accident de savonnerie).—*Revue Internat. du Trachome.* 1927. Jan. Vol. 4. No. 1. pp. 39–41.

[25] LESTAGE & SOULOUMIAC. Syndrome oculaire à forme de cyclite déterminé par l'instillation de la solution obtenue au moyen de grains de Vals. —*Arch Méd. et Pharm. Nav.* 1927. Jan.–Feb.–Mar. Vol. 117. No. 1. pp. 64–68.

[26] KIRBY (D. B.). A Study of the Nutrition of the Crystalline Lens.—*Trans. Amer. Acad. Ophthalm. & Oto-Laryn.* 1926. pp. 137–154.

[27] CRUICKSHANK (M. M.). Observations on the Complications following 4,000 Cases of Cataract Extraction.—*Brit. Jl. Ophthalm.* 1927. June. Vol. 11. No. 6. pp. 275–284. [12 refs.]

The patient who violently squeezes his eye whilst being operated upon for cataract is a danger to himself and a cause of grave anxiety to the surgeon. Paresis of the orbicularis by injections of novocaine and adrenalin solution is now largely employed as a means of meeting this contingency. R. E. WRIGHT[28] recommends that paresis of the whole facial nerve should be induced by an injection at the stylomastoid foramen. An assistant pulls the lobe of the ear upwards and forwards. The surgeon locates the tip of the mastoid process by a finger of his left hand and enters the needle at this level behind the fold of skin made by the drawn up lobe. The needle, which at first lies horizontally, is pushed upwards, inwards and backwards towards the anterior face of the process. On touching the bone it is slightly withdrawn and is worked round until it is just deep to the inner aspect of the anterior border of the process. A series of advances and withdrawals is made until the syringe lies in an almost vertical position. The point of the needle traverses the digastric fossa during the manoeuvre and comes to lie in the neighbourhood of the stylomastoid foramen. Some twitching of the facial muscles may occur at this stage. 1 to 2 cc. of the novocaine mixture is injected. Facial paralysis should come on in from five to fifteen minutes. WRIGHT uses 4 per cent. novocaine, 2 parts, and 1-1000 adrenalin 1 part. The solution should be freshly prepared. He recommends an "Alston Washerless" dental syringe of 60 minim capacity and a needle 5 cm. long.

It may sometimes prove difficult to control fully the eyeball of a patient under operation—especially when making the section during a cataract extraction. This may be due to an exceptionally delicate conjunctiva, or, more often, to a faulty application of the fixation forceps. This should be applied at right angles to the globe near the limbus; if it is placed obliquely, at an acute angle, the teeth of the instrument are likely to tear through the membrane. DANTRELLE[29] recommends the use of a temporary suture passed through the cornea near the limbus as a means of affording complete control of the globe. A Kalt's needle is threaded with white silk. The silk is fixed by passing the needle back through the strands close to the free end; the inconvenience of a knot is thus avoided. A small bite of corneal tissue, 3 mm.

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[28] WRIGHT (R. E.). Blocking of the Main Trunk of the Facial Nerve in Cataract Operations based on Experience of over 150 Cases.—*Arch. of Ophthalm.* 1926. Vol. 55. No. 6. pp. 555–559.

[29] DANTRELLE. De la contention du globe nouveau procédé de fixation.—*Ann. d'Oculistique.* 1927. Mar. Vol. 164. No. 3. pp. 201–209. With 6 text figs.

long and parallel to the limbus, is taken by the needle and the suture is passed. Care is exercised not to enter the anterior chamber. Perfect control of the eyeball can be maintained by gripping the thread with a forceps close to the points of entry and exit. DANTRELLE states that he has never experienced any bad result from this procedure, and that the corneal wound heals without leaving any trace.

Henry SMITH[30], discussing the question of extraction of the lens in its capsule, defends the principle of delivery by pressure applied on the surface of the eye against delivery by traction applied within the eye. He gives due credit to MACNAMARA and MULRONEY for their share in developing the operation of expression in the capsule. Those who attempt BARRAQUER's phakoerisis operation are advised to make the incision larger than that laid down by Barraquer—a full 190° instead of 144°. Smith suggests that Barraquer's successful results are probably due to his having first dislocated the lens by pushing it straight backwards. After dislocation the lens is rolled over and is pushed forwards through the pupil by the instrument which now lies behind it. It is claimed that the great increase during the past thirty years in the number of cataract operations performed in the Punjab, where expression in the capsule holds the field, is evidence that the operation is superior to capsulotomy, since a corresponding increase has not occurred in some other Provinces where capsule laceration is ordinarily done. It may be noted, however, that the statistics quoted for Madras during the same period show an increase in the number of operations almost equal in proportion to that of the Punjab.

J. Russell SMITH[31], dealing with the subject of Barraquer's operation of phakoerisis says, that he has had the opportunity of observing the operation performed in many Indian clinics. He was puzzled by the fact that, whilst BARRAQUER himself is undoubtedly able to perform the operation with perfect success, yet other highly skilled surgeons failed badly, although they followed the recognized technique. He questons the statement that in phakoerisis the zonular fibres of the ligament are ruptured close to the periphery of the lens owing to " vibrations " in the vacuum, whereas in other methods of intracapsular extraction they are dragged out by the roots from the ciliary body; and he states " he has yet to meet anyone who can demonstrate any difference, in the matter of the presence of tags of zonule, between senile cataractous lenses, extracted from the human eye, which is in any way dependent on the method by which they were extracted." He suggests that success in Barraquer's operation is achieved by pushing the lens with the erisophake and not by pulling. The lens is pushed by the instrument slightly backwards into the vitreous, and the zonular fibres are ruptured by its displacement. Care should be taken to dislocate the lower portion of the lens first, pressing it backwards by supinating the forearm ; the upper portion is then displaced by a movement of pronation. Once the lens has been completely dislocated version is performed. The lens can then be delivered as a " tumbler." It is implied that the lens is delivered rather by pressure applied from behind than by traction. It is necessary to make a sufficiently large section.

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[30] SMITH (Henry). Intracapsular Extraction of Cataract, including the Most Recent Advances.—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. pp. 121–126. With 4 text figs.

[31] SMITH (J. Russell). Barraquer's Operation.—*Brit. Jl. Ophthalm.* 1927. Apr. Vol. 11. No. 4. pp. 152–180. With 21 text figs.

*General Diseases.*—

*Kala azar.* BHADURI[32] found non-progressive, radial streaks of *opacity in the lens* of a patient, aged 22, who had suffered from kala azar and had been treated by injections of soamin and sodium ammonium tartrate. A low degree of myopic astigmatism was present. Previous to his illness his vision had been tested by the Ambulance Corps and had been found to be normal. The patient was under Bhaduri's observation for one-and-a-half years and the opacities remained unaltered during the period. The same observer[33] met with a case of *amblyopia following injections of urea stibamine for kala azar.* The patient was a Hindu woman aged 22. Some dimness of vision was noticed after nine injections of the drug. After an interval two further injections were given and the sight then deteriorated to 6-60, but a fortnight later improved to 6-9. Temporal pallor of the optic disc, green blindness, and a slight concentric contraction of the visual field were observed. BHADURI suggests that the renal excretion of the drug may be lowered in such a case ; it would therefore be advisable to lengthen the interval between the injections should this be suspected at any time. Syphilis, too, may be a factor, as the disease may render the optic nerve more sensitive to the poisons contained in the aromatic organic preparations of antimony or arsenic.

*Trypanosomiasis.* NEAME[34] has described in detail the histological findings in the eye of a dog which developed parenchymatous keratitis after an infection with trypanosomiasis. He concludes that a parenchymatous keratitis is often associated with trypanosomiasis in animals of various species, and perhaps also in man, and that in some cases it is accompanied by iritis and cyclitis. The disease seems to bear the closest resemblance clinically and pathologically to distemper keratitis in dogs and to syphilitic keratitis in man. In the specimen examined the corneal epithelium was intact and an infiltration of the substantia propria was present, most marked in the deeper layers at the periphery. Trypanosomes, appearing considerably smaller than when seen in smear preparations, were found in various parts of the substantia propria, being particularly numerous in the neighbourhood of the capillaries. They were also observed in the anterior chamber, in the spaces of the pectinate ligament, and in the vitreous near the ora serrata.

*Myiasis.* WRIGHT[35] has described a case of myiasis of the cornea in a patient suffering from corneal degenerative changes. Maggots developed in blood smeared agar and in glycerine agar tubes on which crusts from the cornea had been implanted. The maggots were hatched out by Wright and the flies were identified by SITARAMA IYER and by W. S. PATTON as *Apiochaeta scalaris* (*ferruginea*), belonging to the family of Phorinae.

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[32] BHADURI (B. N.). A Case of Opacities of the Lens occurring as a Sequel to an Attack of Kala-Azar.—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. p. 144. With 1 diagram in text.

[33] BHADURI (B. N.). Urea Stibamine Amblyopia.—*Calcutta Med. Jl.* 1927. Jan. Vol. 21. No. 7. pp. 327–341. With 1 chart.

[34] NEAME (Humphrey). Parenchymatous Keratitis in Trypanosomiasis in Cattle and in Dogs, and in Man.—*Brit. Jl. Ophthalm.* 1927. May. Vol. 11. No. 5. pp. 209–216. With 5 text figs. [15 refs.]

[35] WRIGHT (Robert E.). Myiasis with Chronic Degeneration of Cornea.—*Amer. Jl. Ophthalm.* 1927. June. Vol. 10. No. 6. pp. 411–412. [1 ref.]

*Miscellaneous.*—Delord & Villard[36] have recorded the case of an unfortunate doctor who, whilst performing vaccination, was struck in the eye by a tiny drop of *vaccine.* The conjunctival sac was immediately washed out, but the conjunctiva became inflamed that evening. Three days later the cornea was ulcerated and the iris intensely inflamed. A severe iridocyclitis occurred in eight days. Secondary glaucoma supervened and the eye was enucleated two months after the accident. Noteworthy features are: (1) the rapidity with which the inflammation developed and extended to the deeper structures; and (2) the intractable character of the inflammation. The authors comment upon the rarity of the condition; but, as Ml. Camus[37] remarked, vaccinia of the lids is not so very uncommon. The reviewer remembers two cases, one being that of a girl suffering from hysterical amblyopia who deliberately inoculated her lids from the arm of a vaccinated baby in the same ward.

*Effect of Glare.* Rippon[38] has found that pilots of the R.A.F. serving in India are liable to be affected injuriously by the glare. This was shown: (1) by ocular irritation; (2) by symptoms of asthenopia; (3) by a diminished power of convergence, and (4) in a few cases by the development of night blindness. Bad landings are a natural consequence. Responsibility rests on the Medical Officer to encourage pilots to keep themselves physically fit. He should be watchful for early signs of ocular fatigue, and should promote the general use of glare protectors.

*Causes of Blindness in Atchin.* Tijssen[39] found that corneal leukomata, often due to smallpox or to trauma, were a common cause of blindness in Atchin. Trachoma, blenorrhoea, and other varieties of infectious conjunctival inflammation appear to be relatively rare amongst the village population. He suggests that a deficiency of vitamin-A may have some part in causing the diseases which produce blindness.

*Reports.*—The Report of the Madras Government Ophthalmic Hospital for the year 1926[40] demonstrates the progressive character of the institution and the vast amount of careful work performed by Lt.-Colonel Wright and his staff. 3,898 in-patients and 23,412 out-patients were admitted, and 5,266 operations (1,601 being for senile cataract) were performed during the year. The statistics relating to the diseases treated are always most interesting. Koch-Weeks conjunctivitis accounted for 1,690 admissions, trachoma for 843, and phlyctenular for 712. 127 cases of keratomalacia were admitted. With regard to cataract, 24 patients suffered from the juvenile form and 2,189 from the senile, whilst only two had lamellar cataract. The comparative rarity of lamellar cataract in South India is notable, and it would be interesting to learn whether this rarity is peculiar or whether it is found in other tropical countries which are subject to climatic conditions similar to Madras. Rickets, too, is seldom seen amongst the lower classes in Southern India; and there is, of course, a well recognized link between the two diseases. Vitreous loss during cararact extraction has been reduced to a low figure—1·46 per cent. Eight per cent. of iris prolapse after operation is, however, a high rate; the statement that a peripheral iridectomy was more frequently employed than in the previous year may have some bearing on the matter. Bacteriological examinations of conjunctival scrapings were made on a series of 205 patients who had undergone a most careful disinfection as a preliminary to cataract extraction. No fewer than 45 per cent. were found to harbour organisms, the majority being staphylococci (found in 35 per cent. of the examinations). These figures are impressive and increase one's respect for the natural defences of the ocular tissues against bacterial invasion. Only 96 cases were subjected to sclero-corneal trephining. This diminution is due to the trial of other operative measures; but it is stated that "as the result of the year's experience the number of trephinings next year will be as high as formerly, because, even in advanced and doubtful cases, trephining seems to be the best way of keeping the tension down." The refraction work of the Hospital is quite considerable, 2,316 patients having been treated for refraction errors during the year. Particulars of many interesting cases are recorded, some with illustrations. A trial was made of X-ray exposures in the treatment of rhinosporidial polypus of the conjunctiva, but it was unsuccessful. Local applications of solutions of quinine sulphate, of antimony tartrate, and of picric acid have all proved failures in this disease. A warning is given against a rather common tendency to diagnose trachoma too readily and in consequence to institute a prolonged and vigorous treatment with silver salts.

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[36] Delord & Villard. Accident oculaire grave par projection de vaccin jennerien.—*Bull. Acad. Méd.* 1927. May 17. Year 91. 3rd Ser. Vol. 97. No. 20. pp. 607–609.

[37] Camus (L.). Discussion of Delord & Villard.—*Bull. Acad. Méd.* 1927. May 17. Year 91. 3rd Ser. Vol. 97. No. 20. pp. 610–611. [1 ref.]

[38] Rippon (T. S.). Flying in Tropical Climates, with Particular Reference to Sun Glare.—*Jl. State Med.* 1927. June. Vol. 35. No. 6. pp. 355–359.

[39] Tijssen (J.). Oorzaken van blindheid in Atjeh.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 1. pp. 99–101.

[40] Madras. Administration Report, Statistics and Professional Rep. of the Govt. Ophthalmic Hospital, Madras, for 1926. [Wright (R. E.).]—33 pp. With 15 figs. on 6 plates. 1927. Madras. Govt. Press.

The Annual Report of the Ophthalmic Section of the Egyptian Government for the year 1923[41] records a steady progress. 156,837 new patients were seen and 82,466 operations were performed during the year. This represents an increase of 17 per cent. and 8 per cent. respectively over the previous year. The figures in connexion with conjunctival diseases are of course most interesting. Trachoma accounted for 135,328 admissions, gonorrhoeal ophthalmia for 9,331, and Koch-Weeks ophthalmia for 4,700. Only one case of ophthalmia neonatorum is shown. Snellen's operation for trichiasis and entropion was performed on 27,498 eyes and mucous membrane grafting on 5,069. School inspection was carried out in sixteen schools. Of 7,551 school-children treated, only 87·3 per cent. had both corneae free from opacity. Primary glaucoma in its various forms led to 3,016 admissions (1·73 per cent. of the total), and senile cataract to 3,013; so that the incidence of the two diseases in Egypt is remarkably similar. Trephining for glaucoma and extraction with iridectomy for cataract were the favoured operations for these conditions. A total of twenty-three hospitals were working at the end of the year.

The first general report of the Memorial Ophthalmic Laboratory at Giza[42] marks an important advance in the attack against tropical and subtropical diseases of the eye. The money for the construction of the laboratory was provided by the Imperial War Graves Commission as a Memorial to the men of the Egyptian Labour and Camel Transport Corps who fell in the Great War. Work was started in September, 1925, under Dr. SOBHY Bey and was carried on by him until the arrival of H. A. HAIG and R. P. WILSON who were appointed Pathologist and Director respectively. Reports are furnished gratis on specimens received from public and private clinics throughout Egypt; and research work on trachoma, gonorrhoeal ophthalmia and glaucoma is being carried out. Post-graduate classes are also held. The laboratory is well placed to secure that co-operation between pathologist and physician which is so essential to success, and it is likely to realize the hopes of MACCALLAN and others responsible for its inception.

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[41] EGYPT. Ministry of the Interior. Dept. of Public Health. Eleventh Ann. Rep. of the Ophthalmic Section, 1923.—29 pp. With 1 chart. 1927. Cairo: Govt. Press.

[42] EGYPT. Ministry of the Interior. Dept. of Public Health. First General Report of the Memorial Ophthalmic Laboratory, Giza. 1926. [WILSON (Rowland P.)]—9 pp.

H. Kirkpatrick.

# REVIEWS AND NOTICES.

KOUMANS (Alfred Karel Jan.) Over lymfocytenwaarden en lymfocytaire functies naar aanleiding der tropenlymfocytose. **[Values and Functions of Lymphocytes in Respect of Tropical Lymphocytosis.]** [Thesis.]—223 pp. With 7 figs. 1926. Maassluis.—J. Van der Endt & Zoon.

The author makes a critical research into the different fundamental methods of making blood smears and recommends the method of smearing the blood drop with a flexible (celluloid) spreader one mm. in thickness in narrow films (six mm. = ¼ inch) on object glasses. For various reasons he prefers ROGER's method of counting to that of SCHILLING. The blood was always taken in the morning before breakfast, and from the finger tip. The staining method was that of KIEWIT DE JONGE.

The figures published by SCHILLING of the proportions of the different blood-cells were found not to be exact. In our latitude the lymphocyte-proportion should be fixed at 30–35 per cent. The significance of the much discussed war-lymphocytosis therefore becomes questionable.

Tropical lymphocytosis begins after a stay of about 18 months and vanishes again in Europe (as is the case also in natives). Lymphocytosis is acquired also by a stay in the arctic regions, in the high mountains and near the sea-shore; the author presumes that these lymphocytoses are caused by the more intensive destruction of the body cells, the result of the more intensive ultra-violet irradiation in the polar regions during the midnight sun period, in the high mountains and near the sea-shore. In the tropics on the contrary the caloric-radiation would cause this phenomenon. These *light*-lymphocytoses are distinguished from the *caloric* lymphocytosis by an accompanying monocytosis, a quicker development, a shorter existence and a reaction of the skin (sun-burn). Together with the change in the lymphocyte count produced by digestion the author regards the above-mentioned forms as physiological lymphocytoses.

Regarding the lymphocytic functions the author states that the lymphocytes take part in digestion of fats and carbohydrates in the intestinal canal, where they activate the pancreatic fluid by producing peptone. In the tissues they provide for the cellular assimilation of the same materials. In connexion with the various methods of causing artificial lymphocytosis, the part that the lymphocytes take in immunization against cancer and tuberculosis is discussed. The author considers the action of Röntgen radiation therefore rather as indirect by production of artificial lymphocytosis than as direct by destruction of tumour cells.

The author has taken much trouble in the preparation of this thesis and even made a voyage to Spitzbergen. The conclusions he arrives at, however, may be open to some criticism. Thus the figures regarding the arctic midnight sun lymphocytosis are rather small and not very conclusive.

A few inaccuracies excepted (on page 24 the Dutch for "physical" is used where "psychical" is meant, and on page 205 "provided" is used for "unless") the contents have been carefully worked out and may be considered as an interesting contribution to the knowledge of lymphocytes.

J. E. Dinger.

SCHLOSSBERGER (Hans). Chemotherapie der Infektionskrankheiten. **[Chemotherapy of Infectious Diseases.]**—*Spezielle Pathologie u. Therapie innerer Krankheiten.* pp. 743–866. With 12 text figs. [n.d.]

The aim of chemotherapy as defined by the author is the sterilization of the infected body by means of substances of defined chemical constitution—in contrast to that effected by chemically undefined serum antibodies. In the first part of the work the development of chemotherapy is traced from the point of view of relationships between chemical constitution and therapeutic action; the important influence of physical characters is also discussed. In the second or special section, each group of chemical substances, e.g., arsenicals, gold compounds, quinine alkaloids, etc., is considered in relation to the particular infections in which the respective substances produce chemotherapeutic effects. A full account is given of the results obtained both in experimental and in naturally acquired infections. Those interested in the historical aspect will find also that the uses of the various drugs in antiquity are dealt with in considerable detail. In the absence of clear proof as to the mode of action of chemotherapeutic agents in many cases, it is pointed out that two possibilities must be borne in mind, viz., that the drug may act either directly upon the parasites or indirectly by stimulating the protective mechanisms of the host. The presentation of the subject is throughout scientific in its form, and the freedom from excess of practical details should enable readers to obtain a good perspective of what is already a large subject. There are few omissions, although mention is not made of the antiseptic properties of mercurochrome, the phenomenon of chemotherapeutic interference in trypanosome infections, or the trypanocidal properties of aminostyrylquinoline compounds. The attention which is paid to the contributions of workers in various countries is a welcome feature. A bibliography of about six hundred references completes this valuable survey.

C. H. Browning.

ROCKEFELLER FOUNDATION. **International Health Board. Thirteenth Annual Report January 1, 1926–December 31, 1926.** [RUSSELL (F. F.)] pp. xiv+219. With 50 figs. (10 maps). 1927. New York: 61 Broadway.

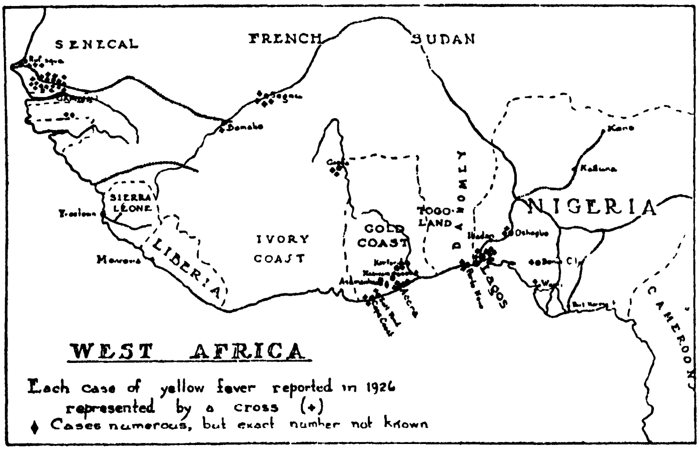
During the year 1926 the International Health Board of the Rockefeller Foundation disbursed (at an administrative cost of about 7 per cent.) more than 3¼ million dollars under the following heads: relief and control of hookworm, 346,735 dollars; county [rural] health work, 241,933; malaria control, 235,502; yellow fever control, 589,254; public health education, 1,292,749; public health nursing, 51,221; public health administration, 49,200; public health laboratories, 39,160; field expenses not specifically allotted, 183,319; miscellaneous charges, 10,319.

For the relief and control of hookworm assistance of various kinds has been given to 10 countries and administrations in tropical America and the West Indies; to Borneo, Ceylon, Java, the Madras Presidency, Malacca, Siam, certain Western Pacific Islands; Seychelles; and to mines in Spain. Research confirmed by experience has shown that the control of hookworm is, like most other big things, a much more critical business than hasty enthusiasts imagine; and also that permanent control of this parasite, as of other things of the same sort, will have to come in the general train of orderly sanitary progress. (Incidentally it has been observed in Panama that sea-water, which aborts the eggs of Ancylostoma, has no detrimental effect upon the eggs of Ascaris).

Aid has been given in multifarious forms—surveys, demonstrations, epidemiological studies, anti-mosquito operations—towards the control of malaria in Corsica, Italy, Poland, Spain, Argentina, Brazil, Nicaragua, Panama, Porto Rico, and the Philippine Islands. In Argentina the most dangerous mosquito appears to be *Anopheles pseudopunctipennis*, and in Porto Rico *A. albimanus*. In Spain the most heavily infected province is said to be Caceres. In dealing with larvae Paris green has been much used, and in Corsica the use of the Cyprinodont fish Gambusia "also met with interesting results;" but as the only instance of these results, as here recorded, was observed in an artificially isolated breeding-place examined ten days after the introduction of the fish, one is not much impressed by their tenour since it is well-known that under chosen conditions fish and other natural enemies are marvellously destructive to larvae. In the United States the control of malaria in rural areas was taken up by the Board, and it is interesting to note the admission that the results are not expected to be spectacular.

A recrudescence of yellow fever in Brazil, due, it is said, to the passage of troops in pursuit of rebels through an old yellow fever area, has necessitated the resumption of anti-larva work in some larger centres of population and in smaller towns on frequented highways. Control stations were also maintained in some of the cities of the coast. Great activity is reported by the West Africa Yellow Fever Commission; the laboratory has been completed, surveys have been made, cases seen, and data of all kinds collected. *Aëdes aegypti.* (=*argenteus*) appears everywhere to be present in sufficiently ominous numbers, particularly in the country round about Ibadan. Attempts to isolate an infective organism have not succeeded. [Since the publication of the report news has been received that although the organism still remains in hiding, the disease has been transmitted from man to monkey by inoculation of blood, and from monkey to monkey both by blood and by the intermediation of *Aëdes argenteus*].

One-sixth of the descriptive pages of the Report is devoted to rural hygiene, towards the developmnet of which the Board has rendered assistance in many countries, though in its breathless enthusiam for the subject the Report does not always clearly indicate the nature and extent of the Board's responsibilities. It is distinctly stated that the Board contributed towards the organization of rural public health services of various kinds in Austria, Czechoslovakia, France, Hungary, Poland, and to 84 rural "health units" in the U.S.A.; again in the detailed description of the first rural "health unit" established in Ceylon it is stated that the Government of Ceylon provides all funds for the support of the unit, except a few subordinates' salaries which are paid by a local municipality; but in the cases of Canada, Brazil, Madras, Nicaragua, and Porto Rico the necessary sources of financial nourishment are not at all clearly defined.



Map of West Africa showing areas from which yellow fever was reported in 1926.

[Reproduced from the *Annual Report of the International Health Board of the Rockefeller Foundation for 1926.*]

As regards the administrative range of a rural "health unit" in a tropical area we may consider the unit recently established at Jasin, in the Straits Settlements, by agreement between the local Government and the Board. Its duties include control of communicable diseases, vaccination and prophylactic inoculations; clinics for treatment of venereal diseases, yaws, hookworm, and malaria; maternity and infant welfare; hygiene of childhood and school; popular instruction in hygiene; and vital statistics. For staff there is provided a district health officer, who is also in medical charge of the local hospital; a dresser, who is also vaccinator and can do routine microscope work; a native public health nurse, holding also a certificate in midwifery: 3 sanitary inspectors and a caretaker; and a part-time microscopist who will do the laboratory work for the hospital and district. The health unit in Ceylon, with a personnel of directing medical officer, 3 nurses, 3 midwives, and 6 sanitary inspectors, is said to have carried out a similar programme satisfactorily.

Under the general heading of central public health organization assistance has been given to many States of the U.S.A. and to several governments of Central America and of Europe. Here is included sanitary engineering (water-supplies, sewage disposal, malaria control), the study and control of epidemics, bureaus of vital statistics, public health laboratories, and assistance to advisory boards and agencies for sanitary reform.

Expenditure on public health education includes aid to schools and institutes of hygiene in London, Harvard, Peking, Brazil, Canada, Trinidad, Czechoslovakia, Denmark, Hungary, Norway, Poland and Jugoslavia; travelling grants to public health officials in the States, Canada, and Europe; travelling fellowships to the number of 170, and 83 resident fellowships; and grants to institutes for the training of public health nurses in Brazil and France.

Finally, in co-operation with the League of Nations, the Board has contributed to study tours (and interchanges) of medical and sanitary officers and sanitary engineers, and to the working of the international epidemiological and public health intelligence service, with particular mention of the Eastern Bureau in Singapore, which serves a vast tract extending more than halfway round the globe from Capetown and Alexandria on the west to Hawaii and Tahiti on the east.

A. Alcock.

DE LANGEN (C. D.). Beri-Beri. Een klinische studie van voeding en ziekte in Nederlandsch-Indië. [**Beriberi. A Clinical Study of Nutrition and Disease in the Dutch East Indies.**]—pp. vii+272. With 2 charts & 1 map in text. 1927. 's-Gravenhage: G. Naeff.

In this study de Langen lays stress upon the importance of clinical observation and classification for the solution of the beriberi problem. Though thoroughly convinced of the vitamin deficiency theory, he thinks that it has been too readily accepted and therefore offers many weak points for the arguments of its opponents. What has been described in the literature as beriberi by no means represents one clinical entity. Polyneuritis from other causes has been taken for beriberi in countries where this disease is endemic and very possibly the liability of rice-eating populations to toxic or infectious polyneuritis may be explained by the relative lack of vitamin B in the diet. On the other hand the increased metabolism under influence of fever in infectious diseases may hasten or cause the outbreak of beriberi by the higher demand on the vitamin stock of the organism. A well defined limitation of what is to be understood by beriberi is necessary. Most value is attached by the author to the symptoms presented in epidemics occurring as local explosions in groups of individuals living under the same conditions (institutions, ships, etc.). In sporadic cases the uniformity of the cause of the disease is not so well established.

The author distinguishes the more common hydropic type and the primary atrophic type, which latter must be distinguished from the cases in which the oedema, though primarily present, has disappeared, either spontaneously or under the influence of rest. The principal symptoms are: (1) Oedema, generally of the legs and in a lighter degree of the face;

(2) peripheral paresis or paralysis of the legs (only in serious cases extending also more or less to the arms), with sensory disturbance but without tenderness of the nervous trunks; and (3) cardiac symptoms (increasing rapidity of the pulse, increased action of the heart, dilatation, and lastly hypertrophy or paralysis). Polyneuritis without cardiac symptoms is not beriberi. Based to a great extent upon the writer's own researches, the application to beriberi of modern clinical methods is discussed in detail (haematology, chemistry of blood and urine). In connexion with the significance of rice in the spread of beriberi rice cultivation in its economical and technical aspects (methods of polishing, storage, etc.) is considered and the tests in use for standardization of rice in respect of its vitamin content are reviewed (determination of phosphorus content, alcohol test, biological test with rice birds or pigeons). In a chapter on experimental biological work on avitaminosis-B the author distinguishes (1) the disease caused in birds by exclusive feeding of polished rice, (2) the avitaminosis-B *sensu strictiori* and (3) actual beriberi. Though denying the identity of these conditions, far from rejecting any connexion like MEGAW he thinks they are intimately related, and in their future study he expects much of experiments with the pure vitamin B, lately isolated by JANSEN and DONATH. Other theories are criticised (exclusive or mixed infection and intoxication theories, either with or without recognition of a part played by avitaminosis).

Finally, the author develops his ideas of the pathogeny of beriberi; he attributes much value to the lipoid metabolism; the ultimate cause he considers to be an alteration of the "coefficient lipocytique" (MAIJER and SCHAEFFER). Such a change may be easily repaired, as is seen in the prompt response of beriberi to adequate dietetic treatment. Clinical as well as experimental evidence, in the author's opinion, point to the existence of a separate anti-oedema vitamin (present, e.g., in butterfat).

De Langen has done good service by this deserving attempt to stress the clinical study of beriberi, which has long been more or less neglected under influence of the great interest attached to laboratory work.

W. J. Bais.

# INDEX OF AUTHORS OR SOURCES.

The bracketed abbreviations after the page numbers indicate the subject.
Page numbers within brackets indicate papers not summarized.

| | | |
|---|---|---|
| Am. | signifies | Amoebiasis and Amoebic Dysentery. |
| Bb. | ,, | Beriberi. |
| Bl. | ,, | Blackwater. |
| B.R. | ,, | Book Review. |
| Chl. | ,, | Cholera. |
| C.Bu. | ,, | Climatic Bubo. |
| Der. | ,, | Tropical Dermatology. |
| Dys. | ,, | Dysentery (Bacillary and Unclassed). |
| Ent. | ,, | Enteric Fevers. |
| Fev. | ,, | Fevers. |
| G.V. | ,, | Granuloma Venereum. |
| Hel. | ,, | Helminthiasis. |
| Hist. | ,, | Historical. |
| H.S. | ,, | Heat stroke . |
| Jaun. | ,, | Infectious Jaundice. |
| K.A. | ,, | Kala Azar. |
| Lab. | ,, | Laboratory Reports. |
| Lep. | signifies | Leprosy. |
| Mal. | ,, | Malaria. |
| Misc. | ,, | Miscellaneous. |
| Myc. | ,, | Tropical Mycology. |
| Oph. | ,, | Tropical Ophthalmology. |
| Pel. | ,, | Pellagra. |
| Pl. | ,, | Plague. |
| Rab. | ,, | Rabies. |
| R.F. | ,, | Relapsing Fever and Other Spirochaetoses. |
| Sc. | ,, | Scurvy. |
| Sp. | ,, | Sprue. |
| S.S. | ,, | Sleeping Sickness. |
| Tb. | ,, | Tuberculosis. |
| Und. | ,, | Undulant and Abortus Fever. |
| Y.F. | ,, | Yellow Fever. |
| Y. & S. | ,, | Yaws & Syphilis. |
| Z. | ,, | Medical Zoology. |

**A**

Abadie, 1014 (Oph.)
Abbatucci, 103 (Y.F.), 205 (Lep.)
Abe, M., 94 (Fev.)
Abelardo Lara, N., (204) (Hel.)
Aben-Athar, J., (856) (Misc.)
Abercrombie, T. F., 729 (Mal.)
Abraham, L., with Morgenroth & Schnitzer, 272, (285) (Mal.)
Abramowitsch, F. E., with Stutzer, 321 (Myc.)
d'Abreu, A. R., 403 (Z.)
Achitouv, with Delamare, 88 *bis* (R.F.)
Acton, H. W., 822, 852 (Misc.)
Adamopoulos, C., 629 (K.A.)
Adamowicz, P., 871 (Z.)
Adams, A. R. D., with Yorke, 15 *bis*, 781 (Am.)
Adamski, 98 (Jaun.)
Adler, S., 643 (K.A.)
——, & Theodor, O., 142 *bis*, 143, 645 *ter* (K.A.), 887 (Z.)
Adoplhi, H., (39 *bis*) (Pl.)
Adova, Nikitinsky & Sebenzow, 883 (Z.)
Advier, 515 (Hel.)
——, with Bablet & Souchard, 762 (Rab.)
——, with Guérin & Borel, 743 (Mal.)
——, with Morin & Marinot, 603 (Bb.)
Africa, C. M. & Sta. Cruz, J. Z., 988 (Hel.)
Agronick, A., 149, 641 (K.A.)
Aguilar, R., 30 (Dys.)
Aguirre Plata, C., 270 (Mal.)
Aitken, A. B., Connal, A., Gray, G. M. & Smith, E. C., 101 (Y.F.)
——, & Smith, E. C., 717 (Y.F.)
Akagi, K., 1000 (Hel.)
Akashi, S., 13 (Am.)
Alcaraz, R. A., 533, 989 (Hel.)
Alcock, A., with Manson-Bahr, 414 (B.R.)
Alessandrini, A., 109 (Und.)
—— & Sette, N., 242 (Misc.)
Alfaro, G. A., 756 (Mal.)
Alfionov, S., with Gaisky, 32 (Pl.)
Alfredo Duarte A., 197 (Hel.)
Allen, E. A., 868 (Z.)
Allyn, H. B., 339 (Hist.)
de Almeida, E., with Barreto, 284 (Mal.)
Alongi, G., with Ciotola, 760 (Rab.)
Altman, K., 254 (Mal.)
Altounyan, E. H. R., 736 (Mal.)
Alvarado, R. & Arroyabe, V., 271 (Mal.)
——, with ——, 267 (Mal.)
—— & González, C., 269 (Mal.)
Alvares, J. M., with de Mello, (544) (Hel.)
Álvarez, W., (285), (758) (Mal.)
Alvarez Soto, N., & Quintana, H., (758) (Mal.)
——, with— 269 (759) (Mal.)
do Amaral, A., 900 (Z.)
Ameghino, A., 757 (Mal.)
American Mission Hospital, 59 (Misc.)
Amid-Zadé, G., with Brenn, 108 (Und.)
Amilcar Luzuriaga, P., & Bacigalupo, J., 698 (R.F.)
Anales de la Facultad de Medicina, Lima, 681 (B.R.)
van Andel, M. A., 208 (Lep.)
Anderson, C., 130 (K.A.)
——, Broc, R., & Cassar, 445 (Der.)
——, with Durand & Lumbroso, 245 (Misc.)
Anderson, C., & de Lagoanère, J. L., 515 (Hel.)
——, with Nicolle, 77 *bis* (R.F.), 134 (K.A.)
Anderson, C. C., 182 (Hel.)
Anderson, H. B., 66 (Misc.)

Anderson, J. S., 669 (Bl.)
Anderson, W. K., 683 (B.R.)
Ando, A., 170, 179 (Hel.)
Ando, R., & Tsuyuki, K., 173 (Hel.)
de Andrade, G., 480 (Oph.)
Andrei, G., (621) (Und.)
Andrews, J. M., 397, 873 (Z.)
——, with Paulson, 866 (Z.)
Andrews, W. H., Manson-Bahr, P., Thomson, J. G., Neame, H., Harvey, D., & Moore, J., 958 (S.S.)
Annales de Médecine et de Pharmacie Coloniales, 408 (Z.)
Annecke, S., 276 (Mal.)
——, with Thomson, 259 (Mal.)
Aoki, T., 553 (Lep.)
Apers, E., & van Boeckel, L., 934 (Pl.)
Aragão, H., 649 (K.A.)
d'Araujo, A., with Nazareth & Gracias, 547 (Lep.)
Araujo, H. C. de S., 555, 907, (922) (Lep.), 681 (B.R.)
Archibald, R. G., 66 (Misc.), 893 (Z.)
Archives de l'Institut Pasteur de Tunis, 230, 766 (Rab.), 812 (Lab.)
Archivos Brasileiros de Medicina, 729 (Mal.)
Ardin-Delteil, 610 (Und.)
Arena, G., 639 (K.A.)
Argüelles, M. V., 214 (Lep.)
Arias Aranda, C., 264 (Mal.), 642 (K.A.)
Arias, J. C., with Mazza, 135 *bis* (K.A.)
Aristowsky, W., & Hoeltzer, R., 84 (R.F.)
Arkush, A. S., with Proescher, 671 (Misc.)
Armstrong, J. S., 305 (Y. & S.)
Armuzzi, G., with Strempel, 690, 691 (R.F.)
Arnozan, X., 379 (Dys.)
Arroyabe, V., & Alvarado, R., 267 (Mal.)
——, with ——, 271 (Mal.)
Artamonoff, A. S., 630 (K.A.)
Artamonov, A. S., 130 (K.A.)
Arzt, L., 289 (Pel.)
Asada, J., 173, 985 (Hel.)
——, with Kohame, 1001 (Hel.)
——, with Ozaki, 173 *bis* (Hel.)
Asbelew, W. N., 665 (Bl.)
Ascione, G., (47) (Chl.)
Ascoli, M. & Sanfilippo, E., 615 (Und.)
Ascoli, V., 268 (285), (Mal.)
Ashner, M., 887 (Z.)
Ashworth, J. H., (903) (Z.)
Assam, 230 (Rab.)
Atkey, O. F. H., 54 (Misc.)
Aubaret, 476 (Oph.)
—— & Mastier, 476 (Oph.)
Aubertot, 872 (Z.)
Auché, J., with Verdelet, 316 (C. Bu.)
Augustine, D. L., 999 (Hel.)
Auricchio, L., 635 (K.A.)
Austin, J. S., 405 (Z.)
Austmann, K. J., 449 (Der.)
Autonomov, V., with Kritchevsky, 581 (S.S.)
Azim, M. A., & Cairo, S., 873 (Z.)

## B

Baars, G., 768 (Rab.)
——, with Miessner, 768 (Rab.)
Baba, F., 204 (Hel.)
Babes, V., & Bobes, S., 223 (Rab.)
Bablet, Advier & Souchard, 762 (Rab.)
Bablet, J., with Bernard, 602 (Bb.)
——, with —— & Guillerm, 602 (Bb.)
——, Guérin, F., Lalung-Bonnaire & Pons, R., 602 (Bb.)
——, Mesnard & Polidori, 625 (Fev.)
——, —— & Stéfani, 358 (Am.)
Bacigalupo, J., 179, 524 (Hel.), 697, 701 *bis*, (R.F.)
——, with Amilcar Luzuriaga, 698 (R.F.)
Backhouse, T. C., with Cilento, 512 (Hel.)
Baetjer, W. A., with Sellards, 787 (Am.)
Bailly, J., 768 *bis* (Rab.)
——, with Remlinger, 761, 764, 766 *bis* (Rab.)
Bais, W. J., & Verhoef, A. W., 848 (Misc.)
Baixe, A., 241 (Misc.)
Baker, G. T., 281 *bis* (Mal.)
Baker, S. L., & Dodds, E. C., 664 (Bl.)
Baldwin, A. H., 543 (Hel.)
——, Heydon, G. M., & Broben, J. A., 779 (Am.)
Baldwin, H. S., & Cecil, R. L., 487 (Misc.)
Balfour, A., 839 (Misc.)
Baliña, P. L., 207, 545 (Lep.)
Ballif, L., Rennescu, N., & Reznic, A., 293 (Pel.)
Balteanu, I., 44 (Chl.)
Bamforth, J., 612 (Und.)
Banaji, B. P., 479 (Oph.)
Banchieri, E., (440) (Z.)
Banerji B. P., 1000 (Hel.)
Barbacci, P., 640 (K.A.)
Barbeau, L. G., 818 (Lab.)
Barber, M. A., 882 (Z.)
——, Komp, W. H. W., & Hayne, T. B., 729 (Mal.)
Barbier, A., 226 (Rab.)
Bard, L., (285) (Mal.)
Barducci, A. V., 748 (Mal.)
Bargehr, P., 216, 559, 910, 919 (Lep.)
Barker, F. A., 96 (Jaun.)
Barlow, C. H., 168, 982 (Hel.)
Bärmann, G., & Smits, E., 740 (Mal.)
Barnes, M. E., & Russell, P. F., 192, 544 (Hel.)
Barnett, L. E., 520 (Hel.)
Barooa, M., 1000 (Hel.)
Barralt, R., with Staffieri & Giacosa, 997 (Hel.)
——, with Testolin, 782 (Am.)
Barraud, P. J., (409) (Z.)
——, with Shortt & Craighead, 132 *bis*, 133, 134, 636, 638 (K.A.)
de la Barrera, J. M., & Riva, A., 978 (Hel.)
Barreto, J. de B. & de Almeida, E., 284 (Mal.)
Barreto, J. S., 726 (Mal.)
Barreto, F., 677 (Misc.)
Bass, C. C., 257, 728 (Mal.)
Batchelder, A., with Meyer, 243 (Misc.)
Bates, J. E., 707 (Jaun.)
Battaglia, M., 586, 972, 973 (S.S.)
Battistini, T., & Weiss, P., 875 (Z.)
Baumann, E. D., 331, 333 (Hist.)
Baumgartner, E. A., 394 (Z.)
——, & Smith, G. D., 382 (Sp.)
Baylis, H. A., & Daubney, R., 249 (B.R.)
Bayon, H. P., 247 (Misc.)
Beck, H., 398 (Z.)
Becker, E. R., 385 (Z.)
Bedford, G. A. H., 431 *bis* (Z.), 589 (S.S.)
Beer, W. A., with Cornwall, 51 (Ent.)
Béguet, 114, 617 (Und.)

Béguet, with Sergent, Edm. & Et., Parrot & Donatien, 140, 649 (K.A.)
——, & Torstenson, H., 610 (Und.)
Beihefte z. Archiv f. Schiffs- und Tropen-Hygiene, 738 (Mal.)
Beklemishev, V., & Mitrofanova, Y., 426 (Z)
Beletsky, W., with Brussin, 970 (S.S.)
Belfanti, S., 902 (Z.)
de Bellard, E. P., 448 (Der.)
Benedict, E. B., 525 (Hel.)
Benhamou, E., 262 (Mal.)
Bennett, S. C. J., 762 (Rab.)
Bequaert, J. C., with Strong, Shattuck & Wheeler, 324 (B.R.)
Bercovitz, N., 461 (Chl.)
Berens, C., & Losey, R. R., 477 (Oph.)
Beretervide, E. A., & de Lara, F., 493 (Misc.)
Bering, F., 281 (Mal.)
Berk, A., with Solomon, Theiler & Clay, 92 (Fev.)
van Berkhout, P. J. T., 605 (Bb.)
Berman, P., with Bogen, 895 (Z.)
Bernard, N., 126 (Bb.)
Bernard, P. N., & Bablet, J., 602 (Bb.)
——, ——, & Guillerm, J., 602 (Bb.)
——, Pons, R., & Lalung-Bonnaire, 602 (Bb.)
Bernasconi, V. E., 91 (R.F.)
——, with Mazza, 145 *bis* (K.A.)
——, & Paterson, G. C., 643 (K.A.)
Berry, G. P., with Fulton, 797 (Dys.)
Berthelot, L., 1014 (Oph.)
Bertrand, M., 648 (K.A.)
Beselin, O., 437 (Z.)
Beteau, J. P., 788 (Am.)
Bettencourt, A., & Borges, I., 986 (Hel.)
Bevan, L. E. W., 564 (S.S.)
Bezzi, M., 890 (Z.)
Bhachech, P. M., 996 (Hel.)
Bhaduri, B. N., 633 (K.A.), 1018 *bis* (Oph.)
Bharadwaj, A. C., 36 (Pl.)
Bharati, S. R., 462 (Chl.)
Bhattacharjya, S. C., 640 (K.A.)
Bhattacharya, A. K., 784 (Am.)
Bhattacharyya, N., 488 (Misc.)
Bianchi, A. E., 749 (Mal.), 786 (Am.)
Bianchi Lischetti, A., 879 (Z.)
Bickov, S. G., 35 (Pl.)
Biglieri, R., & Villegas, C., 225 (Rab.)
Billa, M., with Gaté, 696 *bis* (R.F.)
Bini, G., (758) (Mal.)
Bishop, E. L., 729 (Mal.)
Bishop, L. F. (679) (Misc.)
Biswas, L. M., 899 (Z.)
Biswas, T. N., with Hermitte & Sen Gupta, 30 (Dys.)
Bittinger, W. P., with Fisher, 188 (Hel.)
Black, L. A., with Hull, 609 (Und.)
Blacklock, D. B., 514, 531 (Hel.)
——, & Gordon, R. M., 861 (Z.)
Blajine, A. N., 202, 540 (Hel.)
Blanc, G., & Caminopetros, J., 802 (Dys.)
Blanchard, M., Broudin, L., & Borel, E., 591 (S.S.)
——, & Letrou, G., 659 (Bl.)
Blankenburg, W., 225 (Rab.)
Bloedorn, W. A., & Hakansson, E., (73) (Misc.)
Blondin, (679) (Misc.)
Blum, H., with Karpeles, 536 (Hel.)
Bobbert, A. C., 474 (Oph.)
Bobes, S., with Babes, 223 (Rab.)
Bock, G., 962 (S.S.)
Boeck, W. C., 393 (Z.)
van Boeckel, L., with Apers, 934 (Pl.)
Bogen, E., 401 (Z.)
——, & Berman, P., 895 (Z.)
Boisseau, A., 648 (K.A.)
Boisseau, R., 203 (Hel.)
Bolaffi, A., 231 (Rab.)
Bolognesi, G., 757 (Mal.)
Bonavia, V. J., with Large, 270 (Mal.)
Bonnel, with Creyx, 97 (Jaun.)
Bonnel, F., with Dircks-Dilly, 804 (Dys.)
Bonorino Udaondo, C., & Centeno, A. M., 783 (Am )
——, & Sanguinetti, L. V., 263 (Mal.)
Borchardt, W., 232 (Misc.)
——, with Kudicke, 511 (Hel.)
——, with Mayer & Kikuth, 831 (Misc.)
Borden, W. B., 257 (Mal.)
Bordo, C. A., with Waldorp, 735 (Mal.)
Borel, E., with Blanchard & Broudin, 591 (S.S.)
——, with Guérin & Advier, 743 (Mal,)
——, with Pons, 126 (Bb.)
Borel, M., 251 *ter*, 758 (Mal.), 422, 427 *bis* (Z.)
Borges, I., with Bettencourt, 986 (Hel )
Bosch, G., & Mó, A., 277 (Mal.)
Bossert, 959 (S.S.)
Boston, H. M., 935 (Pl.)
Bouckaert with Bruynoghe & Dubois, 971 (S.S.)
Bouckaert, J. P., with Dubois, 585 (S.S.)
Bougenault, 980 (Hel.)
Boycott, A. A., 434 (Z.)
Boyd, M. F., 726, 729 (Mal.), 881 (Z.)
Boyé, L., 565 (S.S.)
Boyer, with Costa & Placidi, 766 (Rab.)
Boyers, L. M., 5 (Am.)
——, with Kofoid & Swezy, 2 (Am.)
Brachetto-Brian, D., (204) (Hel.)
——, with Mosto, (759) (Mal.)
Bradley, B., (204) (Hel.)
Bradley, G. H., with King, (285) (Mal.)
Brahmachari, U. N , & Dutt, A. M., 635 (K.A.)
——, & Sen, P. B., 232 (Misc.)
Brailsford, J. F., 164 (204) (Hel.)
Braimbridge, C. V., 668 (Bl.)
Branch, A., & Gay, D. M., 994 (Hel.)
——, with ——, 438 (Z.)
Bras de Sá, L. J., (285) (Mal.)
Brau, 103, 104 (Y.F.), 594 (S.S.)
Brazil, V., & Vellard, J., 402, 406 (Z.)
Breakey, S. F., 22 (Dys.)
Breger, 908 (Lep )
Breindl, V., & Jirovec, O., (409) (Z.)
Bremer, K., 988 (Hel.)
Brenn, H., & Amid-Zadé, G., 108 (Und.)
Brennan, C. H., 254 (Mal.)
Bressot, E., 735 (Mal.)
British Medical Journal, 737 (Mal.)
Broben, J. A., with Baldwin & Heydon, 779 (Am.)
Broc, R., with Anderson & Cassar, 445 (Der.)
Brocher, F., (409) (Z.)
Brodin, P., & de la Rivière, D., 95 (Fev.)
Brohier, S. L., 757 (Mal.)
Brokman, H., & Popowski, S., 26 (Dys.)
Brooke, G. E., 859 (B.R.)
Brooke, R., 640 (K.A.)

Broudin, L., with Blanchard & Borel, 591 (S.S.)
Broughton-Alcock, W., 700 (R. F.)
Brown, A. K., with Gardner, 71 (Misc.)
Brown, H. C., with Davis, 968 (S.S.)
Brown, H. W., 998 (Hel.)
Brown, P. W., 15 (Am.)
——, with Magath, 989 (Hel.)
Brown, S., with Jaffé, 588 (S.S.)
Browning, C. H., Cohen, J. B.,Ellingworth, S., & Gulbransen, R., 573 (S.S.)
——, & Gulbransen, R., 965 (S.S.)
Brug, S. L., 380, 390 *bis* (Dys.), (409), 422, (Z.)
Brumpt, E., 7, 21 (Am.), 184 (Hel.), 974 (S.S.)
Bruni, E., 990 (Hel.)
Bruni, N., 587 (S.S.)
Brünn, W., 273 (Mal.)
Brussin, A. M., 690 (R.F.)
——, & Beletzky, W., 970 (S.S.)
——, with Kritschewski, 690 (R.F.)
Bruynoghe, R., & Collon, N., 691 (R.F.)
——, & Dubois, A., 571 (S.S.)
——, ——, & Bouckaert, 971 (S.S.)
——, de Greef, E., & Dubois, A., 693 *bis* (R.F.)
Bua, F., 619 (Und.)
Buchanan, G., 704 (Jaun.)
de Buck, A., Schoute, E., & Swellengrebel, N. H., 879, 880 (Z.)
——, Swellengrebel, N. H., & Schoute, E., 880.
Bugge, G., 981 (Hel.)
Bunker, Jr., H. A., 754 (Mal.)
Burga, B., 642 (K.A.)
Burger, G. C. E., 708 (Jaun.)
Burgess, A. S., 938 (Pl.)
Burgess, E., with Nicholls (51) (Ent.), 766 (Rab.)
Burgess, J., 408 (Z.)
Burke, A., with Roman, 519 (Hel.)
Burkitt, R .W., 667 (Pl.)
Burnet, E., 458 (Pl.), 621 (Und.)
Burnet, J., 525 (Hel.)
Burnier, with Jeanselme, 144 (K.A.)
Burton-Fanning, F. W., & Cleveland, A. J., 100 (Jaun.)
Busson, B., 230, 231, 770 (Rab.)
Butler, C. S., (73) (Misc.)
Butt, H. T. H., with Frew, 48 (Ent.)
Buxton, P. A., 941 (B.R.)

C

Cabral, J., 555, 556 (Lep.)
——, with de Mello, 553, 555 (Lep.)
Cabred, R. G., 259 (Mal.)
Cadbury, W. W., 702 (Fev.)
Cade, A., Morenas & Ravault, P., 68 (Misc.)
Caffrey, P. J., 79 (R.F.)
Cairo, S., with Azim, 873 (Z.)
Calamatta, D., 1012 (Oph.)
Calatroni, R., 921 (Lep.)
Calazans, S., (51 *bis*) (Ent.)
Calcutta, 230 (Rab.), 837, 838 (Misc.)
Caldwell, F. C., & Caldwell, E. L., 533, 1008 (Hel.)
Callanan, J. C. J., 275 (Mal.), 397 (Z.), 511, 977 (Hel.)
Camail, with Rigollet, Motais, Dumas, Le Dentu & Lasnet, 160 (B.R.)
Cambessédès, H., 384 (Sp.)
Cameron, A. T., & Nicholson, D., 494 (Misc.)
Cameron, G. R., 181 (Hel.)
Cameron, T. W. M., 510, 521 (Hel.)
Caminopetros, J., with Blanc, 802 (Dys.)
Camotim, V., with de Mello, 649 (K.A.)
Campbell, G. (73) (Misc.)
Campos, F., 423 (Z.)
Camus, L., 1019 (Oph.)
Canaan, T., 547 (Lep.)
Cannon, A., 462, 924 (Chl.)
Cantor, S. J., 806 (Pel.)
Capecchi, E., 534 (Hel.)
Cardamatis, J. P., 669 (Bl.), (758) (Mal.)
Carman, J. A., 673 (Misc.), 979, 991 (Hel.)
Carpenter, C. M., 114, 117 (Und.)
——, & Merriam, H. E., 110 (Und.)
——, with Moore, 111 (Und.)
Carpenter, G. D. H., 561, 953 (974) (S.S.)
Carr, H. P., 195 (Hel.)
Carrere, J., 395 (Z.)
Carsten, M., 535 (Hel.)
Carter, H. F. (73) (Misc.)
Carvaillo, R., & Sautet, J., 18 (Am.)
Casaux & Houdemer, 526 (Hel.)
Cassar, with Anderson & Broc, 445 (Der.)
Castellani, A., 88 (R.F.), 157, 240 (Misc.), 319 (Myc.).
——, & Taylor, F. E., 677 (Misc.)
Castex, M. R., 6 (Am.)
——, & Greenway, D., 6 (Am.), 203 (Hel.)
Castillo Odena, I., 537 (Hel.)
de Castro, A. B., 260 (Mal.), 895 (Z.)
Castro Paullier, V., & Errecart, L., 557 (Lep.)
Catanei, A., 151 (Misc.), 701 (R.F.)
——, Grosdemange, L., & Legroux, C., 445 (Der.)
——, with Montpellier, 320 (Myc.), 446 (Der.)
——, with Sergent, Et. (285) (Mal.)
Catasús, J. M., with Vilanova, 920 (Lep.)
Cawston, F. G., 174, 516, 517, 985, 986, 987 (Hel.)
Cazanove, F., 718 (Y.F.), 996 (Hel.)
Cazeneuve, H. J., 934 (Pl.)
Céard, L., 308 (Y. & S.)
Ceccherelli, R., 223 (Rab.)
Cecil, R. L., with Baldwin, 487 (Misc.)
Celli, A., 350 (Hist.), 411 (B.R.)
Cénac, M., with Claude & Targowla, 752 (Mal.)
Cendali, G., 555 (Lep.)
——, with Franchini, 554 (Lep.)
Centeno, A. M., with Bonorino Udaondo, 783 (Am.)
Cerqueira, A., 700 (R.F.)
Cerrutti, C., 118 (Und.)
Chachina, S., 224 (Rab.)
Chadwick, C. R., & McHattie, C., 648 (K.A.)
Chagas, C., 966 (S.S.)
Chahovitch, X., 129 (Sc.)
Chaigneau, Y., 996 (Hel.)
Chalam, B. S. (409), 425, 882 (Z.)
——, with Young, 889 (Z.)
Chand, K., with Shortt, Craighead & Swaminath, 637 (K.A.)
Chand, W. (51) (Ent.)
Chandler, A. C., 174, 190, 191, 538, 990, 1003 *bis* (Hel.)
——, & Chopra, R. N., 235 (Misc.)
Channon, H. A., 24 (Dys.)
——, & Wright, H. D., 591 (S.S.)
Chapin, E. A., 401 (Z.)
Charles, R. H., 503 (B.R.)

Charrier, H., & Remlinger, P. (758) (Mal.)
Chastel, with Pons, 218 (Lep.)
Chatridse, I., 789 (Am.)
Chatrieux, H., 662 (Bl.)
Chatterjee, G. C. (903) (Z.)
Chatterjee, N., 237 (Misc.)
Chatterjee, S. C., 23 (Dys.)
Chatterji, D. M., 975 (Hel.)
Chatterji, K. K., 503 (B.R.)
Chaves, J. A., 830 (Misc.)
Chen, K. K., & Hsiang-Chuan Hou, 511 (Hel.)
Cheng Fang Tsu, 177 (Hel.)
Chenoy, C. F., 236 (Misc.)
Child, H. J., 391 (Z.)
Choay, A. (856) (Misc.)
Chopra, R. N., (856) (Misc.)
——, with Chandler, 235 (Misc.)
——, & De, P., 234 *bis*, 235 (Misc.)
——, with Ghosh, N. N., 233 (Misc.)
Choudhury, K. L., with Strickland, 772 (B.R.)
Chowdhury, K. L., with Strickland, 883 (Z.)
Choy, P. D., 353 (Am.)
Christophers, S. R., & Sinton, J. A., 253 (Mal.)
——, ——, & Covell, G., 881 (Z.)
Christopherson, J. B., 517 (Hel.)
Churchill, F. S., Landis, E. M., & Glusker, S. D., 119 (Fev.)
Chun, J. W. H. & Wu Lien Teh, 597 (Bb.)
Chyurlia, N., 319 (Myc.)
Cilento, R. W., & Backhouse, T. C., 512 (Hel.)
Ciotola, A., & Alongi, G., 760 (Rab.)
Clara, P., 256 (Mal.)
Clark, H. C., 232 (Misc.), 732 (Mal.)
Claude, H., Targowla, R., & Cénac, M., 752 (Mal.)
Clay, C. L., with Solomon, Berk, & Theiler, 92 (Fev.)
Clayton, F. H. A., 22, 367 (Dys.)
Cleare, Jr., L. D., 878 (Z.)
Clément, R., 317 (C.Bu.)
Cleveland, A. J., with Barton-Fanning, 100 (Jaun.)
Cleyndert, Jr., P. C., 706 (Jaun.)
Clifford, S. H., 26 (Dys.)
Cochez, with Meslay, 784 (Am.)
Cochrane, R. G., 209, 212, 214, 911 (Lep.), 943 (B.R.)
Coelho, J. G., 218 (Lep.)
Cohen, J. B., with Browning, Ellingworth & Gulbransen, 573 (S.S.) )
Colas-Belcour, J., with Roubaud, 885, 888 (Z.)
Cole, A. F., 1011 (Oph.)
Cole, H. A. (679) (Misc.)
Coleman, R. B., 174 (Hel.)
Coles, A. C., 87 (R.F.)
Collier, W. A., with Kudicke, 579 (S.S.)
Collin, L., 1014 (Oph.)
Collon, N., with Bruynoghe, 691 (R.F.)
Compte-Rendu du Premier Congrès International du Paludisme, Rome, 771 (B.R.)
Connal, A., 434 (Z), 815 (Lab.)
——, with Aitken, Gray & Smith, 101 (Y.F.)
Connor, F., 994 (Hel.)
Conoor, Southern India, 230 (Rab.)
Conos, B. (73) (Misc.)
Conseil, E., with Durand, 934 (Pl.)
——, with Nicolle, 451 (Der.)
Cook, A. R., & Stones, R. Y., 149 (K.A.)
Cook, C., 548 (Lep.)
Cooke, W. E., with Low, 632 (K.A.)
Cool, P., 908 (Lep.)
Cooley, T. B., & Lee, P., 670 (Misc.)
Cooper, G. W., with Wells, 152 (Misc.)
Cordes, W., 452 (Der.), 985 (Hel.)
Cordier, G., 970 (S.S.)
Cormack, J. G. (73) (Misc.)
Cornwall, J. W., 51 (Ent.), 230 (Rab.)
——, & Beer, W. A., 51 (Ent.)
Corrêa, C., with Pessoa, 871 (Z.)
——, with ——, & da Silveira, 523 (Hel.)
Cort, W. W., Grant, J. B., Stoll, N. R., & others, 193 (Hel.)
——, with Stoll & Kwei, 981 (Hel.)
Cosimo, B. V., 669 (Bl.), 703 (Fev.)
Cossio Etchecopar, M., with Mazza, 529 (Hel.)
da Costa, P., 843 (Misc.)
Costa, S., Boyer & Placidi, L., 766 (Rab.)
da Costa, S. F. G., 168 *ter*, 1001 (Hel.)
Coudray, F. E. C., 337 (Hist.)
Coughlin, W. F., with Shattuck & Little, 315 (G.V.)
Courtis, B., 890 (Z.)
Courtois-Suffit, Garnier & Liège, 111 (Und.)
Cousin, G., 432 (Z.)
Coutelen, F., 524 (Hel.)
Coutinho, E., 729 (Mal.)
Couto, M., 125 (Bb.), 729 (Mal.)
Couvy, L., 718 (Y.F.)
Covell, G., 881, 884 (Z.), 942 (B.R.)
——, with Christophers & Sinton, (881) (Z.)
Covey, G. W., 390 (Z.)
Cowdry, E. V., 762 (Rab.)
Cowen, S. O., 382 (Sp.)
Cox, W. C., 900 (Z.)
Coyne, A. E., 601 (Bb.)
Craig, C. F., 18, 351, 364 (Am.)
——, & St. John, J. H., 351 (Am.)
Craighead, A. C., with Barraud & Shortt, 636, 638 (K.A.)
——, with Shortt & Barraud, 132 *bis*, 133, 134 (K.A.)
——, with ——, Chand & Swaminath, 637 (K.A.)
Cramer, B., with Fuchs, Ferro & Puiggari, 1012 (Oph.)
Crampon, P., with Duhot & Lefèbvre, 181 (Hel.)
Crawford, M., 768 (Rab.)
Cremona, P., & Serravalle, G., 763 (Rab.)
Creyx & Bonnel, 97 (Jaun.)
Crimmins, M. L., 406 (Z.)
Crocco G., & Lottico, S., (922) (Lep.)
Crouch, H. A., with Whitehead, 95 (Jaun.)
Cruciani, J. A., with Viton & Vivoli, 698 (R.F.)
Cruickshank, M. M., 479, 1015 (Oph.)
Cruto, A., with Trocello, 233 (Misc.)
Cruz, O., with de Faria, 875 (Z.), 966 (S.S.)
Cuboni, E., 278 (Mal.)
Cumming, H. S., 729 (Mal.)
Cumpston, J. H. L., & McCallum, F., 929 (Pl.)
Cunningham, J., Nicholas, M. J., & Lahiri, B. N., 229 (Rab.)
——, & Theodore, J. H., 694 (R.F.)
Curson, H. H., 640 (K.A.)

**D**

Dabbadie, (73) (Misc.)
Dalal, C. M., 994 (Hel.)
Dalmeyer, J. J., 12 (Am.)

Dante, F., 277 (Mal.)
Dantrelle, 1016 (Oph.)
Dargein, G., & Doré, G., (679) (Misc.)
Darleguy, with Vialard, 8, 799 (Am.)
Dascalopoulos, N., 1011 (Oph.)
Datta, J. K., 247 (Misc.)
Daubney, R., 164 (Hel.)
——, with Baylis, 249 (B.R.)
Daude, J., with Ledentu, 565 (S.S.)
David, H., 927 (Chl.)
——, with Schnürer, 769 (Rab.)
Davie, T. M., 289 (Pel.)
Davies, D. S., 508 (Hel.)
Davies, G. R., 763 (Rab.)
Davies, J. H. T., 212 (Lep.)
Davies, R. M., with Newman, 14 (Am.)
Davis, L. J., & Brown, H. C., 968 (S.S.)
Davis, N. C., 725 (Mal.)
Dawson, W. R., 684 (B.R.)
De, P., with Chopra, 234 *bis*, 235 (Misc.)
De, S. N., 66 (Misc.)
Dear, W. R., 1012 (Oph.)
Debré, R., & Petot, C., 809 (Pel.)
Deggeller, O., 598 (Bb.)
Delamare, G., 91 (R.F.), (285) (Mal.)
——, & Achitouv, 88 *bis* (R.F.)
Delanoë, P., 380 (Dys.)
De la Rivière, D., with Brodin, 95 (Fev.)
Delgado, L. B., with Nicolas, 551 (Lep.)
Delord & Villard, 1019 (Oph.)
Delorme, M., 450 (Der.)
Dembo, L. H., Ruh, H. O., Fargo, W. C., & Taylor, G. R., 93 (Fev.)
Demjanow, G. G., 733 (Mal.)
Demjanow, G. S., 263 (Mal.)
Den Hartog, B. J. C., 156 (Misc.)
Denney, O. E., 219 (Lep.)
Derkatsch, W. S., 926 (Chl.)
Derrien, E., 524 (Hel.)
——, with Lemaire & Thiodet, 523 (Hel.)
Deschiens, R., 385, 392, (410), 867 (Z.), 790 (Am.)
Destéfano, F., & Vaccarezza, R. F., 72 (Misc.)
Dévé, F., 524 (Hel.)
Devesa, 31 (Dys.)
Dew, H. R., 180 (Hel.)
Dickinson, R. F. O'T., 258 (Mal), 872 (Z.)
Dideboulidzé, G., with Makhirladzé, 543 (Hel.)
Didebuladze, with Makhirladze, 509 (Hel.)
Dilling, W. J., 247 (Misc.)
Dimitri, V., 261 (Mal.)
Dimitroff, V. T., 714 (Jaun.)
Dingmann, A., 1003 (Hel.)
Dios, R. L., with Mühlens, Petrocchi & Zuccarini, 682 (B.R.)
——, Zuccarini, J. A., & Werngren, E. T., 390 (Z).
Dircks-Dilly, J., & Bonnel, F., 804 (Dys.)
Dive, G. H., 626 (Fev.)
Dixon, P. K., 307 (Y. & S.)
Djokič, A., & Stambuk, D., 738 (Mal.)
Dobell, C., 307 (Y. & S.)
——, & Laidlaw, P. P., 363 (Am.)
Dobronravov, W., 450 (Der.)
Dodds, E. C., with Baker, 664 (Bl.)
Dogiel, V., & Fedorowa, T., 388 (Z.)
Domingo, P., & Vidal, J., 50 (Ent.)
di Domizio, G., 595 (S.S.)
Donaldson, A. W. H., 687 (R.F.)
Donath, J. & Heilig, R., 282 (Mal.)
Donath, W. F., with Jansen, 126, 607, (608) (Bb.)
——, with Mengert-Presser, 855 (Misc.)
——, ——, & Oudendal, A. J. F., 490 (Misc.)
Donatien, A., with Parrot, 141, 647 (K.A.)
——, with Sergent, Edm. & Et., & Béguet, 649 (K.A.)
——, with ——, Parrot & Béguet, 140 (K.A.)
——, with Sergent, E.,——, & Lestoquard, 387 (Z.)
Doorenbos, W. B., 880 (Z.)
Dopter, C. A. H., 782 (Am.)
Doré, G. R., 379 (Dys.)
van Dorssen, J. H. M., 344 (Hist.)
Dostrowsky, A., 641 (K.A.)
Dowling, O., 729 (Mal.)
Drensky, K., & Hegner, R. W., 398 (Z.)
v. Drigalski, W., & Koch, E. W., (544) (Hel.)
Driver, J. R., Gammel, J. A., & Karnosh, L. J., 279 (Mal.)
Dubois, A., 584 (S.S.), (856) (Misc.)
—— & Bouckaert, J. P., 585 (S.S.)
——, with Bruynoghe, 571 (S.S.)
——, with ——, & Bouckaert, 971 (S.S.)
——, with —— & de Greef, 693 *bis* (R.F.)
del Duca, D., 1001 (Hel.)
Duchon, L., with Flandin, 9 (Am.)
Duffie, H., 612 (Und.)
Duhot, E., Crampon, P., & Lefèbvre, J., 181 (Hel.)
Duke, H. L., (51) (Ent.), 814 (Lab.), 945, 947, 949 (S.S.)
Dumas, with Rigollet, Motais, Le Dentu, Lasnet & Camail, 160 (B.R.)
Dumas, R., 204 (Hel.)
Dungal, N., 795 (Dys.)
Dunlap, A. M., 137 (K.A.)
Dunn, L. H., 424, 897 (Z.)
Dunscombe, W. K., 921 (Lep.)
Dupuy, L., (73) (Misc.), 744 (Mal.), 788 (Am.)
Duque, H., 729 (Mal.)
Durand, P., 245 (Misc.), 514 (Hel.)
——, Anderson, C., & Lumbroso, U., 245 (Misc.)
——, & Conseil, E., 934 (Fl.)
——, & Lumbroso, U., 244 (Misc.)
Durham, F. M., Marchal, J., & King, H., 572 (S.S.)
du Toit, P. J., with Theiler, 386 (Z.)
Dutt, A. M., with Brahmachari, 635 (K.A.)
Duval, with Guillement, 738 (Mal.)
Duwez, J., with Houssiau, 267 (Mal.)
Duyck, 236 (Misc.)
Dwijkoff, P., 585 (S.S.)
Dwyer, J. P., with McCallum, 627 (Fev.)

**E**

Early, P. V., 200 (Hel.)
Edwards, F. W., 421 (Z.)
Efremowa, N., with Ioff, 894 (Z.)
Eggers, H., 496 (Misc.)
Eguchi, S., 203 (Hel.)
——, with Hayashi, Oshima & Hozumi, 624 (Fev.)
Egypt, 1020 *bis* (Oph.)
Eichelbaum, H. R., 152 (Misc.)
Eichholtz, F., 738 (Mal.)
Eiselberg, K. P., 741 (Mal.)
Eisler, M., & Kovács, N., 467 (Chl.)

El Bakry, M. M., 482 (Oph.)
Elders, C., 382 (Sp.)
Eliascheff, O., with Jeanselme, 310 *bis* (Y. & S.)
Elkeles, G., 792 (Dys.)
——, & Schneider, A., 24, 792 (Dys.)
Ellingworth, S., with Browning, Cohen & Gulbransen, 573 (S.S.)
Elliott, R. H., 477 (Oph.)
Emile-Weil, P., 986 (Hel.)
——, & Stieffel, 654 (Bl.)
Emily, 161 (Hel.)
Endo, M., with Tanaka, 599 (Bb.)
Endo, N., with Yabe, 607 (Bb.)
Engel-Bey, F., 216 (Lep.)
Enrico, C., 617 (Und.)
Eroussalimtchique, G. L., with Gloukhoff, Wolkowa & Panine, 372 (Dys.)
Errecart, L., with Castro Paullier, 557 (Lep.)
Eschbach, H., 148 (K.A.)
Escomel, E., 392 *bis* (Z.)
Escudero, A., with Escudero, P., & Peco, 522 (Hel.)
Escudero, P., Escudero, A., & Peco, G., 522 (Hel.)
Espié, A., 190 (Hel.)
——, with Juillet, 543 (Lep.)
Esquier, 549 (Lep.)
Esquivel, R., & Lasta, C. G., 763 (Rab.)
Eubanas, F., 271 (Mal.)
Evans, A. C., 611, 614 (Und.)
——, with Francis, 116 (Und.)
Evtikhiev, A., (940) (Pl.)

**F**

Faggioli, R., 890 (Z.)
Fahim Girgis Ibrahim, 472 (Oph.)
Fairley, N. H., 175, 176, 517, 518 (Hel.)
——, & Jasudasin, F., 518 (Hel.)
——, & Mackie, F. P., 175 (Hel.)
Fajardo, J., Lopez-Rizal, L., & Padua, R. G., 284 (Mal.)
Falleroni, D., 424, 426, 859 *bis* (Z.)
Far Eastern Association of Tropical Medicine, 506 (Misc.), 599 (Bb.)
Fargo, W. C., with Dembo, Ruh & Taylor, 93 (Fev.)
de Faria, G., & Cruz, O., 875 (Z.), 966 (S.S.)
Farjot, A., with Melnotte, 855 (Misc.)
Fauqué, M. C. J. (679) (Misc.)
Faust, E. C., 170, 507, 532 (Hel.), 251 (Mal.), 385 (Z.)
——, & Ke-Fang, Z., 172 (Hel.)
——, & Khaw, O. K., with Ke-Fang, Y. & Yung-an, C., 983 (Hel.)
——, & Nishigori, M., 512 (Hel.)
Faust-Newton, C., 290 (Pel.)
Favilli, G., 113 (Und.)
Federated Malay States, 723 (Mal.)
Federated Malay States, Rep. Inst. Med. Res., 819, 820 (Lab.)
Fedorowa, T., with Dogiel, 388 (Z.)
Fedulow, A. W., 865 (Z.)
Feigenbaum, A., 473 (Oph.)
Felt, E. P., 419 (Z.)
Ferguson, E. W., 890 (Z.)
Fermi, C., 427 (Z.), 770 (Rab.)
Fernandez, A. A., 150 (Misc.)
Fernández, L., with Lopez-Rizal & Gutierrez, 296 (Y. & S.)
Fernán-Núnez, M., 979 *bis*, 1002 (Hel.)
Ferro, with Fuchs, Puiggari & Cramer, 1012 (Oph.)
Fialho, A., 729 (Mal.)
Fielding, J. W., (903) (Z.)
Filho, P., 320 (Myc.)
Finaly, R., 1000 (Hel.)
Finocchio, M., with Volpino, 228 (Rab.)
Finzi, G., 110 (Und.), 227, 769 (Rab.)
Fischer, O., (51) (Ent.), 738, 745, 746 (Mal.)
——, with Mühlens, 738 (Mal.)
Fischer, W. O. & Orenstein, A. J., 1004 *bis* (Hel.)
Fisher, C. F., & Bittinger, W. P., 188 (Hel.)
Flandin, C., & Duchon, L., 9 (Am.)
Fleisher, M. S., with Kotkis & Wachowiak, 319 (Myc.)
Fleming, W. D., with Shepard, 384 (Sp.)
Fletcher, W., & Kanagarayer, K., 794 (Dys.)
——, & Lesslar, J. E , 122, 123 *ter* (Fev.)
Fleury, G., 482 (Oph.)
Flu, P. C., 835 (Misc.)
Flury, F., & Loeb, F., 513 (Hel.)
Foà, G , 733 (Mal.)
Foley, H., with Parrot, (149) (K.A.)
——, with Sergent, Edm. & Et., & Parrot, 641 (K.A.)
da Fonseca, O., 872 (Z.)
——, & Muniz, J., 396 (Z.)
Forrest, S., (856) (Misc.)
Foster, P., 636 (K.A.)
——, with Napier, 636 (K.A.)
Foulon, with Liégeois, 157 (Misc.)
Fourneau, E., Tréfouël, M., & Mme. & de Lestrange-Trévise, 674 (Misc.)
Fowler, C. E. P., 755 (Mal.)
Fox, E. C. R., 230 (Rab.)
Fox, H., 313 (G.V.)
França, C., 140 (K.A.), 177, 178 (Hel.), 329 (Hist.)
Franchini, G., 8 (Am.), 431 (Z.), 750, 756 (Mal.)
——, & Cendali, G., 554 (Lep.)
Francis, E., & Evans, A. C., 116 (Und.)
Frankenberger, C., 854 (Misc.)
Fraser, A. M., Kinloch, J. P., & Smith, J., 367 (Dys.)
Fraser, D. M. M., with McCall-Smith, 802 (Dys.)
Freeborn, S. B., 876 (Z.)
Freeman, W., 751 (Mal.)
Freiman, M., 742 (Mal.)
Frew, A., & Butt, H. T. H., 48 (Ent.)
Frias, D., with Mazza, 400, 894 (Z.)
Frimodt-Möller, C., 492 (Misc.)
Frise, W., Sdrodowskii, P., & Minervin, S., 613 (Und.)
Fronville, G., 744 (Mal.)
Fuchs, E., Ferro, Puiggari, I., & Cramer, B., 1012 (Oph.)
Fujii, T., Saito, S., & Shionoya, H., 203 (Hel.)
Fujimaki, Y., & Matsumuro, H., 604 (Bb.)
Fujimoto, A., with Torikata, 796 (Dys.)
Fujinami, A., 519 (Hel.), (608), (Bb.)
Fülleborn, F., 187, 198, 527, 528, 529, 532, 540, 993, 1008 (Hel.), 450 (Der.)
Fulton, R. A. H., 520 (Hel.)
Fulton, M. N., & Berry, G. P., 797 (Dys.)
Funke, J., 366 (Am.)

Futaki, K., 370 (Dys.)
——, Takaki, I., Taniguchi, T., Ohsumi, S., Ishiwara, K., & Ohtawara, T., 702 (Fev.)

**G**

Gabarrou, F. G., 743 (Mal.)
Gabbi, U., 855 (Misc.)
Gabrielidès, C., 1014 (Oph.)
Gaehlinger, H., 69 (Misc.)
Gage, E. E., & Gregory, D. A., 111 (Und.)
Gaglazov, B. G., 120 (Fev.)
Gaiski, N., 32 (Pl.)
Gaisky, N. A., (940) (Pl.)
——, & Alfionov, S., 32 (Pl.)
Galloway, D. J., 704 (Jaun.)
Galloway, I., with Levaditi & Nicolau, 569 (S.S.)
Galloway, S. A., with Mathis, 87 (R.F.)
Galouzo, J. G., with Yakimoff, Rastégaïf & Loukianoff, 873 (Z.)
Gamble, C. J., 282 (Mal.)
Gammel, J. A., & Karnosh, with Driver, 279 (Mal.)
Gardner, F., & Brown, A. K., 71 (Misc.)
Garin, G., 394 (Z.)
Garmatty, K. I., with Semionow, 982 (Hel.)
Garnier, with Courtois-Suffit & Liège, 111 (Und.)
Garrone, E., 735 (Mal.)
Gaté, J., & Billa, M., 696 *bis* (R.F.)
Gavino, C., 462 (Chl.)
Gay, D. M., & Branch, A., 438 (Z.)
——, with ——, 994 (Hel.)
Geiger, J. C., with Kaplan & Williamson, 780 (Am.)
van Gelder, A. H., 96 (Jaun.)
Génevray, 203 (Hel.)
Genevray, J., with Morin, 80 (R.F.)
Georg, C. T., 855 (Misc.)
de Georges, L. V., 229 (Rab.)
Gerbasi, M., 703 (Fev.), 778 (Am.)
Gerber, C. W., 769 (Rab.)
Germain, L., & Neveu-Lemaire, M., 439 (Z.)
German, O. A., 225 (Rab.)
German, S. G., 536 (Hel.)
Ghiron, M., 657 (Bl.)
Ghosh, N. N., with Chopra, 233 (Misc.)
Giacosa, R. A., with Staffieri & Barralt, 997 (Hel.)
Giemsa, G., 738 (Mal.)
——, Weise, W., & Tropp, C., 272 (Mal.) 399 (Z.)
Giese, C., 226 (Rab.)
Giglioli, G., 703 (Fev.), (903) (Z.)
Giglioli, M., (410) (Z.)
Gill, C. A., 863 (Z.)
Gioseffi, M., 285 (Mal.) (410) (Z.)
Girard, G., 934 (Pl.)
——, & Robic, J., 762 (Rab.)
Giuffré, M., 614 (Und.)
Glaser, R. W., 679 (Misc.)
Glénard, R., (73) (Misc.)
Glökler, F., 157 (Misc.)
Gloukhoff, K. T., Wolkowa, E. A., Eroussalimtchique, G. L., & Panine, L. G., 372 (Dys.)
Glusker, S. D., with Churchill & Landis, 119 (Fev.)
Goeckerman, W. H., with O'Leary & Parker, 279 (Mal.)
Goldberger, J., 290 (Pel.)
——, & Wheeler, G. A., 811 (Pel.)
Gold Coast, Ann. Rep. Med. Res. Inst., 817 (Lab.)
Golov, D., & Ioff, I., 434 (Z.)
Golov, D. A., & Joff, I. G., 937 (Pl.)
Gomes, J. M., 921 (Lep.)
——, & Pessôa, S. B., 699 (R.F.)
Gomperts, H. C., 530 (Hel.)
Gonsalves, N. B., 227 (Rab.)
González, C., with Alvarado, 269 (Mal.)
Gonzalez Olaechea, M., 736 (Mal.)
Goodman, H., 304 (Y. & S.)
Gopalan, N., (680) (Misc.)
Gordon, R. M., 178 (Hel.)
——, with Blacklock, 861 (Z.)
Gorovits-Vlasova, L. M., 225 (Rab.)
Goubin, V., 926 (Chl.)
Goubine, V. M., 928 (Chl.)
Gourfinkell, M., 203 (Hel.)
Goyle, A. N., 932 (Pl.)
Gracias, E., with Nazareth & d'Araujo, 547 (Lep.)
Graf, E., 260 (Mal.)
Graham, J. D., 39 (Pl.), 923 (Chl.)
Grant, H. G., 729 (Mal.)
Grant, J. B., with Cort, Stoll & others, 193 (Hel.)
Gravot, 269 (Mal.)
Gray, A. M. H., 648 (K.A.)
Gray, G. A., 389 (Z.)
Gray, G. M., with Aitken, Connal & Smith, 101 (Y.F.)
Graziano, F., 633 (K.A.)
Graziosi, A., 616 (Und.)
de Greef, E., with Bruynoghe & Dubois, 693 *bis* (R.F.)
Green-Armytage, V. B., 156 (Misc.)
Greenbaum, S. S., 808 (Pel.)
Greene, E. F., 650 (Bl.)
Greenway, D., 395 (Z.)
——, with Castex, 6 (Am.), 203 (Hel.)
Gregory, D. A., with Gage, 111 (Und.)
Grigorieva, S. P., 749 (Mal.)
Grimes, C., 36 (Pl.)
Grönholm, V., 473 (Oph.)
Grosdemange, L., with Catanei & Legroux, 445 (Der.)
Grossmann, E., 274 (Mal.)
Grossmann, H., with Uhlenhuth, 97 (Jaun.)
de Grôsz, E., 476 (Oph.)
Gueidon, E., with Sergent, Et. & Pages, 648 (K.A.)
Guérin, F., with Bablet, Lalung-Bonnaire & Pons, 602 (Bb.)
——, Borel, E., & Advier, M., 743 (Mal.)
Guerrero, L. E., 546 (Lep.)
Guerricchio, A., 392 (Z.)
Guerrini, G., 933 (Pl.)
Guillement & Duval, 738 (Mal.)
Guillerm, J., with Bernard & Bablet, 602 (Bb.)
Guillet, R., 688 (R.F.)
——, with Jouenne, 552 (Lep.)
Guillon, A., 448 (Der.), 513 (Hel.)
——, & Kéruzoré, A., 737 (Mal.)
Gulbransen, R., with Browning, 965 (S.S.)
——, with ——, Cohen & Ellingworth, 573 (S.S.)

Gundrum, F. F., & Snyder, J. R., 525 (Hel.)
Gupta, B. M. D., 635 *bis* (K.A.)
Gupta, C. C. D., 373 (Dys.)
Gupta, T. P. S., 237 (Misc.)
Guthrie, A. C., 707 (Jaun.)
Guthrie, J. B., 292 (Pel.)
Gutierrez, A. F., with Gutierrez, 847 (Misc.)
Gutierrez, P. D., & Gutierrez, A. F., 847 (Misc.)
Gutierrez, P., with Lopez-Rizal & Fernandez, 296 (Y. & S.)
Guzmán, P. A., 187 (Hel.)
Guzmán Barrón, A., 122 (Fev.)

H

Hachitani, T., Takita, J., & Shoetensack, M., 466 (Pl.)
Hadfield, G., with White, 807 (Pel.)
Hadwen, S., 431 (Z.)
v. Hahn, F. V., 129 (Sc.)
Hahn, M., & Hirsch, J., (47), 471 (Chl.)
Hakansson, E., with Bloedorn, (73) (Misc.)
Hakki, I., 885 (Z.)
Halfer, G., (680) (Misc.)
Haliapina, K., 229 (Rab.)
Hall, F., 911 (Lep.)
Hall, G. A. M., 10 (Am.)
Hall, M. C., 164, 165 (Hel.)
——, & Shillinger, J. E., 166, 167 (Hel.)
Hallé, J., & Mollaret, P., 783 (Am.)
Hamilton, R. G., 212 (Lep.)
Hamlyn-Harris, R., 878 (Z.)
Hanschell, H. M., 277 (Mal.), 667 (Bl.)
Hanson, H., 105 (Y.F.)
Hara, M., with Higuchi, Kondo, Narita & Matsuzawa, 605 (Bb.)
Hara, T., Takada, R., & Matsumuro, H., (608) (Bb.)
Hardenburgh, W. A., 729 (Mal.)
Hardy, T. L., & Savery, H. M., 702 (Fev.)
Harold, C. H. H., 420 (Z.)
Harris, R. H., 892 (Z.)
Harrison, C. H., 21 (Am.)
Hartman, E., 874 (Z.)
——, with Werner, 588 (S.S.)
Hartoch, O., Schlossberger, H., & Joffe, W., 371 (Dys.)
den Hartog, J. C., & van Steenis, P. B., 712 (Jaun.)
Harvard Institute for Tropical Biology and Medicine, 324 (B.R.)
Harvey, D., with Andrews, Manson-Bahr, Thomson, Neame & Moore, 958 (S.S.)
Hase, A., 404 (Z.)
Haslam, J. F. C., 538 (Hel.)
Hasley, D. E., with Huddleson & Torrey, 619 (Und.)
Hassall, A., with Stiles, 249 (B.R.)
Hasselmann, G., 874 (Z.)
Hasson, J., 212, 911 (Lep.)
Hatcher, R. A., & Weiss, S., 273 (Mal.)
——, with ——, (73) (Misc.)
Haughwout, F. G., 333 (Hist.)
Hausheer, W. C., & Herrick, C. A., 195 (Hel.)
——, ——, & Pearse, A. S., 197 (Hel.)
Hawley, P. R., 831 (Misc.)
Hayashi, N., Oshima, F., Eguchi, S., & Hozumi, K., 624 (Fev.)
Hayes, S. N., 361 (Am.)
Hayman, Jr., J. M., & Lynch, Jr., F. B., 708 (Jaun.)
Hayne, T. B., 729 (Mal.)
——, with Barber & Komp, 729 (Mal.)
Health, Melbourne, 61 (Misc.)
Hearle, E., 500 (B.R.)
Hegner, R. W., 276 (Mal.), 387 *ter*, 390, 870 (Z.)
——, with Drensky, 398 (Z.)
Heiling, R., with Donath, 282 (Mal.)
Heimberger, L. F., 309 (Y. & S.)
Hein, G. E., 978 (Hel.)
Heinemann, H., 603 (Bb.), 849 (Misc.)
——, & Heinemann, L., 239 (Misc.)
Heitzmann, O., 721 (Y.F.)
Hektoen, L., 204 (Hel.)
Henderson, J. M., 910 (Lep.)
Henning, with Steiner & Steinfeld, 83 (R.F.)
Henry, T. A., 911 (Lep.)
Hercelles, O., 624 (Fev.)
Hercus, C. E., 521 (Hel.)
Hermans, E. H., 309 (Y. & S.)
Hermitte, L. C. D., Sen Gupta, S. C., & Biswas, T. N., 30 (Dys.)
Herms, W. B., 433 (Z.)
Hernandez Bautista, D., 104 (Y.F.)
Heronimus, E. S., with Kritschewski, 582 (S.S.)
Herrera-Batteke, P. P., & West, A. P., 217 (Lep.)
Herrick, C. A., with Hausheer, 195 (Hel.)
——, with —— & Pearse, 197 (Hel.)
Herrmann, E., with Uhlenhuth, 711 (Jaun.)
Herrmann, O., 231, 765 *bis* (Rab.)
Herschendörfer, A., 474 (Oph.)
Herszky, P., 525 (Hel.)
Hertig, M., with Young, 133 (K.A.)
Herzfeld, G. M. A., & Mackie, T. J., 93 (Fev.)
Hess, H., 199 (Hel.)
Heydon, G. M., 167, 1007 (Hel.)
——, with Baldwin & Broben, 779 (Am.)
Heymann, P., 746 (Mal.)
Heymons, R., 439 (Z.)
Hicks, E. P., (940) (P.L.)
Higuchi, M., with Sugimoto, Yasuda, Momoyeda & Tanaka, 598 (Bb.)
Higuchi, T., 604 (Bb.)
——, Kondo, M., Hara, M., Narita, S., & Matsuzawa, K., 605 (Bb.)
Hiles, I., 521 *bis* (Hel.)
Hill, C. M., 391 (Z.)
Hill, R. B., 196, 200, 1004 (Hel.)
Himmelfarb, J. K., 939, 940 (Pl.)
Hindle, E., Hou, P. C., & Patton, W. S., 138, (K.A.)
——, & Patton, W. S., 137 138, 639 (K.A.)
——, with ——, 130, 639 (K.A.), 389, 428 (Z.)
Hingston, H., 65 (Misc.)
Hinshaw, H. C., (903) (Z.)
Hirai, M., 1001 (Hel.)
Hiraishi, S., with Koidzumi & Koino, 187 (Hel.)
Hiraishi, T., 998 (Hel.)
Hirsch, J., 45 *bis* (Chl.)
——, with Hahn, (47), 471 (Chl.)
Hirst, L. F., 453, 930 (Pl.)
Hirst, S., 898 (Z.)
Hitti, J. K., 148 (K.A.)
Hoare, C. A., 20 (Am.)
Hodgson, E. C., 230 (Rab.), 630 (K.A.)
——, Vardon, A. C., & Singh, Z., 730 (Mal.)
Hodson, V. S., 736 (Mal.)

Hoeltzer, R., with Aristowsky, 84 (R.F.)
——, & Zabolotzkaja, T., 693 (R.F.)
Hoeppli, R., 991 (Hel.)
——, with Stepanow-Grigoriew, 527 (Hel.)
Hoffman, F. L., 729 (Mal.)
Hoffman, W. A., 409, 426 (Z.)
Hoffmann, W. H., 106, 107, 721, (722) *quat* (Y.F.), 549, 916, 918 (Lep.)
——, & Ramos Báez, P., 209 (Lep.)
Hofman, A., 689 (R.F.)
Homma, H., 159 (Misc.)
Honig, P. J. J., & Swellengrebel, N. H. H., 344 (Hist.)
van Hoof, L., 446 (Der.), 949, 950 (S.S.)
Hopkins, R., 211 (Lep.)
Hora, S. L., 898 (Z.)
Hörlein, H., 264 (Mal.)
Horowitz-Wlassowa, L., 523 (Hel.)
Horster, H., with Wiechmann, 83 (R.F.), 274 (Mal.)
Hoshizaki, S., 829 (Misc.)
Hosomi, S., & Yoshino, M., (758) (Mal.)
Hosoya, Y., with Yamazaki, 828 (Misc.)
Hou, P. C., with Hindle & Patton, 138 (K.A.)
Houdemer, with Casaux, 526 (Hel.)
Houssiau & Duwez, J., 267 (Mal.)
Houssiau, F., (285) (Mal.)
Howitt, B. F., 391 *bis* (Z.)
Hozumi, K., with Hayashi, Oshima & Eguchi, 624 (Fev.)
Hsiang-Chuan Hou, with Chen, 511 (Hel.)
Huddleson, I. F., Hasley, D. E., & Torrey, J. P., 619 (Und.)
——, & Winter, O. B., 620 (Und.)
Hudellet, (680) (Misc.)
Hudelo & Rabut, 825 (Misc.)
Hughens, H. V., 530 (Hel.)
Huizenga, L. S., 91, 696 (R.F.), 549 (Lep.)
Hull, T. G., & Black, L. A., 609 (Und.)
Hume, E. E., 342 (Hist.)
Hung, S. L., 195 (Hel.)
Hunter, R. N., (51) (Ent.)
Huppenbauer, C. B., (73) (Misc.)
Hurry, J. B., 497 (Misc.)
Hurst, A. F., 377 (Dys.)
Hyvert, R., (680) (Misc.)

## I

Ibanez Puiggari, M., 1012 (Oph.)
Ichok, G., 335 (Hist.), 522 (Hel.)
Ignacio, M., with Sison, 50 (Ent.)
——, with Sison, A. G., Sison, A. B. M., & Navarro, 678.
Ignatiev, A., 935 (940) (Pl.)
Iisaka, K., (221) (Lep.)
Ikeda, K., 59 (Misc.)
Ikuji, K., 534 (Hel.)
Illingworth, J. F., 401 (Z.)
Ilvento, A., (73) (Misc.)
Impey, S. P., 553 (Lep.)
Inada, R., 713 (Jaun.)
Indian Medical Gazette, 52 (Misc.)
Indian Medical Record, (559) (Lep.)
Infurna, G., 869 (Z.)
Ingram, A., 894 (Z.)
——, with Mitchell & Pirie, 772 (B.R.)
——, & Pirie, J. H. H., 37 (Pl.)
Inhelder, H. E., 262 (Mal.)
Inouye, Z., & Kakihara, T., 465 (Chl.)
——, with Takano & Ohtsubo, 463 (Chl.)
International Rabies Conference Paris, 483 (Rab.)
Ioff, I., & Efremowa, N., 894 (Z.)
——, with Golov, 434 (Z.)
Ionnesco, D., 762 (Rab.)
Irisawa, T., & Sakamoto, T., (608) (Bb.)
d'Irsay, S., 338 (Hist.)
Isabolinsky, M., & Zeitlina, A., 222 (Rab.)
Ishibashi, E., with Takahira, (608) (Bb.)
Ishii, T., (680) (Misc.)
Ishikawa, S., with Morinaka, 188 (Hel.)
Ishiwara, K., with Futaki, Takaki, Taniguchi, Ohsumi & Ohtawara, 702 (Fev.)
Ishizu, Y., 99 (Jaun.)
Isobe, M., 183, 989 (Hel.)
Itagaki, S., & Makino, R., 995 (Hel.)
Italy, 727 (Mal.)
Ito, K., 172 (Hel.)
Itoh, M., 286 (Pel.)
Iwanow, E., & Mesnil, F., 972 (S.S.)
Iyer, A. S. V., 677 (Misc.)
Iyer, M. A. K., (856) (Misc.)
Izar, G., 785 (Am.)
—— & Mastrojeni, G., 620 (Und.)
Izawa, T., 802 (Dys.)
Izumi, M., with Katsurada & Kubo, 597 (Bb.)

## J

Jackson, E. S., 897 (Z.)
Jaensch, P. A., 481 (Oph.)
Jaffé, R. H., & Brown, S., 588 (S.S.)
Jahnel, F., 694 (R.F.)
——, & Lange, J., 304 (Y. & S.)
James, S. P., (758) (Mal.)
James, W. M., 1 (Am.)
Jameson, P. C., 476 (Oph.)
Jamison, S. C., 155 (Misc.)
Jamot, E., 560 (S.S.)
——, with Tanon, 268 (Mal.), 833 (Misc.)
——, & Vernon, 961 (S.S.)
Jandula, R., (758) (Mal.)
Jansen, B. C. P., & Donath, W. F., 126, 607, (608) (Bb.)
Jassinowsky, M. A., 871 (Z.)
Jasudasin, F., with Fairley, 518 (Hel.)
Jatzenko, T., 427 (Z.)
Java, K. G., 479 (Oph.)
Jeanselme, E., 144 (K.A.)
——, & Burnier, 144 (K.A.)
——, & Eliascheff, O., 310 *bis* (Y. & S.)
Jermoljewa, S., 469 (Chl.)
Jessner, M., 311 (Y. & S.), 647 (K.A.)
Jettmar, H. M., 38 (Pl.)
Jirovec, O., with Breindl, (409) (Z.)
Joannidès, G. S., 846 (Misc.)
Joannovitch, G., 230 (Rab.)
Jobling, B., 433 (Z.)
Joff, I., with Wagner, 33 (Pl.)
Joffe, H., (758) (Mal.)
Joffe, W., with Hartoch & Schlossberger, 371 (Dys.)
Johannessohn, F., 85 (R.F.)
Johansen, F. A., with Lemann & Liles, 558 (Lep.)
Johns, F. M., 352 (Am.), 440 (Z.)
Johnson, T. L., with Taliaferro, 587 (S.S.)

Johnson, W. B., 90 (R.F.)
——, with Lloyd & Rawson, 891 (Z.)
Johnston, L. P., 315 (G.V.)
Jolly, G. G., 303 (Y. & S.)
Jona, A., 534 (Hel.)
Jones, P. H., with Turner, 12 (Am.)
Jonnesco, D., 223 (Rab.)
Jorge, R., 705 (Jaun.)
Jose, I. B., (73) (Misc.)
Joseph, A., 81, 694 (R.F.)
Joseph, G. W. N., & Manson, J. S., 803 (Dys.)
Jouenne, P., & Guillet, R., 552 (Lep.)
Joukowsky, J., 270 (Mal.)
Journal of the Burma Research Society, 499 (B.R.)
Joyeux, C., 858 (B.R.), 990 (Hel.)
Juhl, E., 803 (Dys.)
Juillet, A., & Espié, A., 543 (Hel.)
Junes, E., 476 (Oph.)
Junior, V., 720 (Y.F.)

K

Kabeshima, T., 471 (Chl.), 712 (Jaun.)
Kadaner, M., 61 (Misc.)
Kagaia, Y., 902 (Z.)
Kakegawa, S., with Sugimoto & Yasuda, 606 (Bb.)
Kakihara, T., with Inouye, 465 (Chl.)
Kanagarayer, K., 1000 (Hel.)
——, with Fletcher, 794 (Dys.)
——, with Kingsbury, 793 (Dys.)
——, with Lesslar, 91 (R.F.)
Kandelaki, S., 885 (Z.)
Kaneko, T., with Yano, Shimizu & Shirai, 163 (Hel.)
Kaplan, B., Williamson, C. S., & Geiger, J. C., 780 (Am.)
Kaplan, M. W., 373 (Dys.)
Karczag, L., 291 (Pel.)
Karmann, P., 227 (Rab.)
Karnosh, L. J., with Driver & Gammel, 279 (Mal.)
Karpeles, F., & Blum, K., 536 (Hel.)
Katahira, S., 902 (Z.)
Kato, T., 601 (Bb.)
Kato, Y., (452) (Der.), (544) (Hel.)
Katsurada, F., Izumi, M., & Kubo, K., 597 (Bb.)
Kauntze, W. H., 798 (Dys.), 813 (Lab.)
Kawanishi, K., with Oiso, 1005 (Hel.)
Kawata, K., 374 (Dys.)
Kawatani, S., 769 (Rab.)
Ke-Fang, Z., with Faust, 172 (Hel.)
Kehrer, J. K. W., & Oudendal, A. J. F., 541 (Hel.)
Kellersberger, E. R., 568 (S.S.)
Kenya, Ann. Rep. Med. Res. Lab., 813 *bis* (Lab.)
Kenya Medical Journal, 247 (Misc.)
Kérandel, J., 64 (Misc.)
Kerr, I., 911 (Lep.)
Kerr, J. A., with Rickard, 539 (Hel.)
Kéruzoré, A., 676 (Misc.)
——, with Guillon, 737 (Mal.)
Kessel, J. F., 20, 356 (Am.), 393 (Z.)
——, with Svensson, 540 (Hel.)
Khalil, M., 161, 174, 516, 517 (Hel.)
Khan, G. P., with Shanks, 155 (Misc.)
Khan, K. M., 995 (Hel.)
Khan, M., 677 (Misc.)
Khan, O. K., with Faust, Ke-Fang & Yung-an, 983 (Hel.)
Khartoum, Kitchener School of Medicine, 54 (Misc.)
Khaw, O. K., 171 (Hel.)
Kikuth, W., with Mayer & Borchardt, 831 (Misc.)
Kilkuth, W., with Regendanz, 973 (S.S.)
Kimura, H., with Moteki, (856) (Misc.)
King, G. E., 989 (Hel.)
King, H., (974) (S.S.)
——, with Durham & Marchal, 572 (S.S.)
King, W. V., & Bradley, G. H., (285) (Mal.)
Kingsbury, A. N., 746 (Mal.)
——, & Kanagarayer, K., 793 (Dys.)
Kingsbury, J., & Peck, S. M., 316 (G.V.)
Kinloch, J. P., with Fraser & Smith, 367 (Dys.)
Kirby, D. B., 1015 (Oph.)
Kirkpatrick, H., 472, 1011 (Oph.)
Kirschner, L., with Otten, 800 *bis* (Dys.)
Kitagawa, S., with Takahira, 605 (Bb.)
Klarenbeek, A., with Levaditi, 959 (S.S.)
Klein, B., 183 (Hel.)
Klein, L., 436 (Z.)
Kleine, F. K., 946 (S.S.)
Kligler, I. J., & Weitzman, I., 573, 575 (S.S.), 803 (Dys.)
Klodnitzki, N., 32 (Pl.)
Knizawsky, A., with Nikanorov, 936 (Pl.)
Kobayashi, H., 162, 169, 170 (Hel.), 252 (Mal.), 794 (Dys.)
Kobayashi, K., 794 (Dys.)
Kobori, K., 184 (Hel.)
Koch, D. A., with Wagener, 138 (K.A.)
Koch, E. W., 535 (Hel.)
——, with v. Drigalski, (544) (Hel.)
Kofoid, C. A., 3 (Am.)
——, & Swezy, O., Boyers, L. M., 2 (Am.)
Kogan, D. A., 526 (Hel.)
Kogan, D., with Semenow, 980 (Hel.)
Kohgame, Y., & Asada, J., 1001 (Hel.)
Köhler, G., 247 (Misc.)
Kohn, S., 516 (Hel.)
Koidzumi, M., 252 (Mal.), 425 (Z.), 997 (Hel.)
——, Hiraishi, S., & Koino, H., 187 (Hel.)
Koino, H., 190 (Hel.)
——, with Koidzumi & Hiraishi, 187 (Hel.)
Kojima, S., 488 (Misc.)
Kolesnikoff, N., 108 (Und.)
Komori, K., with Yamada, 994 (Hel.)
Komp, W. H. W., with Barber & Hayne, 729 (Mal.)
Kondo, K., (285) (Mal.)
Kondo, M., with Higuchi, Hara, Narita & Matsuzawa, 605 (Bb.)
Kondo, S., 764, 768 (Rab.)
Kondo, Y., 658 (Bl.)
Konovalova, S., 936 (Pl.)
Koopmann, H., & Krüger, E., 376 (Dys.)
Kopstein, F., 474 (Oph.)
Kopstein, P. F., 409 (Z.)
Ko-Ran, 471 (Chl.)
Korchitz, E. V., 634 (K.A.)
Korke, V. T., 192, 531 (Hel.)
Korownikow, A. F., 896 (Z.)
Kotkis, A. J., Wachowiak, M., & Fleisher, M. S., 319 (Myc.)
Koumans, A. K. J., 1022 (B.R.)
Kouwenaar, W., (680) (Misc.), 705 (Jaun.)

Kovács, N., 468 (Chl.)
——, with Eisler, 467 (Chl.)
Krantz, W., 82, 86 (R.F.)
Kranzfeld, A., 229 (Rab.)
Kraus, R., 404 (Z.), 505 (B.R.)
——, & Michalka, J., 224 (Rab.)
Krause, E., 526, 991 (Hel.)
Krige, C. F., 760 (Rab.)
Krijgsman, B. J., 397, 398 (Z.)
Krinitzky, S. I., 224 (Rab.)
Krishnamurty, C., (758) (Mal.)
Kritchevsky, I., & Autonomov, V., 581. (S.S.)
Kritschewski, J. L., 689 (R.F.)
——, & Brussin, 690 (R.F.)
——, & Heronimus, E. S., 582 (S.S.)
Kritschewsky, I. K., & Tscherikower, R., (701) (R.F.)
Kritschewsky, I. L., 669 (Bl.)
Kritschewsky, L. W., 689 (R.F.)
Kroó, H., 84 (R.F.)
Krueger, A. P., with Proescher & Ryan, 322 (Myc.)
Krüger, E., with Koopmann, 376 (Dys.)
Kubo, K., with Katsurada & Izumi, 597 (Bb.)
Kudicke, R. & Borchardt, W., 511 (Hel.)
——, & Collier, W. A., 579 (S.S.)
——, & Weise, W., 167 (Hel.)
Kudo, R., 20 (Am.)
Kupffer, A., 916 (Lep.)
Kuruhashi, T., 996 (Hel.)
Kuwataro, 172 (Hel.)
Kwei, W. S., with Stoll & Cort, 981 (Hel.)

L

Labernadie, V., 906 *bis* (Lep.)
Lacy, G. R., & Sellards, A. W., 297 (Y. & S.)
——, with Schöbl & Sellards, 300 (Y. & S.)
——, with Sellards & Schöbl, 297 (Y. & S.)
La Face, L., 424 (Z.)
Lagrange, E., 154 (Misc.), 341 (Hist.)
Lahiri, B. N., with Cunningham & Nicholas, 229 (Rab.)
Laidlaw, P. P., with Dobell, 363 (Am.)
Lal, R. B., & Yacob, M., 470 (Chl.)
Lalung-Bonnaire, with Bablet, Guérin & Pons, 602 (Bb.)
——, with Bernard & Pons, 602 (Bb.)
——, with Pons, 603 (Bb.)
Lambert, A. C., 805 (Pel.)
Lambling, A., with Lesne & Marquezy, 247 (Misc.)
Lamborn, W. A., 862 (Z.)
Lampe, P. H. J., 518, 986 (Hel.)
Lamson, P. D., & Wing, R., 235, 674 (Misc.)
Landeiro, F., 215 (Lep.)
Landis, E. M., with Churchill & Glusker, 119 (Fev.)
Landsteiner, K., & Levine, P., 467 (Chl.)
Lane, C., 202 *bis*, 542, 1007 (Hel.)
Lang, M. C., 403 (Z.)
Lange, J., with Jahnel, 304 (Y. & S.)
de Langen, C. D., (285) (Mal.), 597 (Bb.), 1025 (B.R.)
Langeron, M., 74, 75 (B.R.)
Lara, C. B., with Wade, 909, 911 (Lep.)
de Lara, F., with Beretervide, 493 (Misc.)
Large, D. T. M., & Bonavia, V. J., 270 (Mal.)
Larrousse, F., 435 (Z.)
Lasnet, 716 (Y.F.)
——, with Rigollet, Motais, Dumas, Le Dentu & Camail, 160 (B.R.)
Lasta, C. G., with Esquivel, 763 (Rab.)
Laurent, J. M., 101, 103 (Y.F.)
Lavier, G., 952, 953 (S.S.)
Lazaresco, E., with Puscariu, 1013 (Oph.)
Lea, J. A., 1014 (Oph.)
Leach, H., 307 (Y. & S.)
League of Nations, (47) (Chl.), 857 (B.R.), 945 (S.S.)
Le Bourgo, 56 (Misc.)
Le Dantec, A., 666 (Bl.)
Ledentu, G., 567 (S.S.)
——, & Daude, J., 565 (S.S.)
——, with Rigollet, Motais, Dumas, Lasnet & Camail, 160 (B.R.)
——, & Vaucel, M., 956, 958, 962 (S.S.)
Lee, C. U., 529 (Hel.)
Lee, D. H. K., 671 (Misc.)
Lee, P., with Cooley, 670 (Misc.)
Léeb, F., with Flury, 513 (Hel.)
Le Fanu, G. E. H., 718 (Y.F.)
Lefèbvre, J., with Duhot & Crampon, 181 (Hel.)
Lefrou, G., 842 (Misc.)
——, with Blanchard, 659 (Bl.)
Le Gac, 688 (R.F.), 1004 (Hel.)
Legendre, J., 119 (Fev.), 889 (Z.)
Leger, M., 34 (Pl.), 132 (K.A.), (459) (Pl.), 514 (Hel.), 548, (922) (Lep.)
Legroux, C., with Catanei & Grosdemange, 445 (Der.)
Leichtentritt & Opitz, 589 (S.S.)
Leitch, J. N., 272 (Mal.)
Leiper, R. T., 510 (Hel.)
Lemaire & Thiodet, 182, 522 (Hel.)
——, ——, & Derrien, 523 (Hel.)
Lemaire, G., 182 (Hel.)
Lemann, I. I., Liles, R. T., & Johansen, F. A., 558 (Lep.)
Le Meillour, with Mesnard & Stefani, 734 (Mal.)
Lenzmann, R., 282 (Mal.)
Leon, M., 981 (Hel.)
Leon, N., (204), (Hel.)
Lépine, P., 148 (K.A,.), 627 (Fev.), 715 (Jaun.)
Le Prince, J. A., 729 (Mal.)
Le Roy des Barres, 271 (Mal.)
Lesbre, P., with Worms & Sourdille, 366 (Dys.)
Lesne, E., Marquezy, R., & Lambling, A., 247 (Misc.)
Lesslar, J. E., with Fletcher, 122, 123 *ter* (Fev.)
——, & Kanagarayer, K., 91 (R.F.)
Lestage & Souloumiac, 1015 (Oph.)
Lester, A. R., 877 (Z.)
Lestoquard, F., with Parrot, 147 (K.A.)
——, with Sergent, E., Parrot & Donatien, 387 (Z.)
de Lestrange-Trévise, with Fourneau & Tréfouël, M. & Mme., 674 (Misc.)
Letschenko, 899 (Z.)
Levaditi, C., & Klarenbeek, A., 959 (S.S.)
——, Nicolau, S., & Galloway, I., 569 (S.S.)
——, ——, & Schoen, R., 760 (Rab.)
Levine, P., with Landsteiner, 467 (Chl.)
Levy, D. J., & Pierson, M., 179 (Hel.)
Lévy, R., 409 *bis* (Z.)

Lewis, E., 289 (Pel.)
Lhuerre, H., 61 (Misc.)
Li, K. H., 260 (Mal.)
Li, T. M., 472 (Oph.)
Lieb, C. W., 1002 (Hel.)
de Liebermann, L., 475 (Oph.)
Liège, with Courtois-Suffit & Garnier, 111 (Und.)
Liégeois, M., & Foulon, 157 (Misc.)
Lieo, K. W. J., 462 (Chl.)
Liles, R. T., with Lemann & Johansen, 558 (Lep.)
Lim, C. E., 609 (Und.)
Limtcher, L. F., with Scriabin, Podiapolsky & Sankin, 982 (Hel.)
Lindeman, S. J. L., 763 (Rab.)
Lindemberg, A., 146 (K.A.)
Lindner, M. B., with Warren & Smith, 612 (Und.)
Lindsay, J. W., 405 (Z.)
Lindtrop, G. T., 202 (Hel.)
Lindtrop, H., 543 (Hel.)
Lippincott, L. S., 158 (Misc.)
Lipscomb, H. R., 783 (Am.)
Lister, F. S., 818 (Lab.)
Lister Centenary Exhibition, Wellcome Historical Medical Museum, 684 (B.R.)
Little, E. G., 212 (Lep.)
Little, H. G., with Shattuck & Coughlin, 315 (G.V.)
Little, J. P., 481 (Oph.), 544 (Hel.)
Llambias, J., 184 (Hel.)
——, & Mosto, D., 143 *bis* (K.A.)
Lloyd, L., 433 (Z.)
——, Johnson, W. B., & Rawson, P. H., 891 (Z.)
Lloyd, R. B., (680) (Misc.)
——, Muir, E., & Mitra, G. C., 558 (Lep.)
Lobo, V., 756 (Mal.)
Lodato, G., 835 (Misc.)
Loevenhart, A. S., & Stratman-Thomas, W. K., 674 (Misc.)
Loewenthal, W., 763 (Rab.)
van Loghem, J. J., 469 (Chl.)
Logue, J. B., & Morrison, Jr., O. B., 231 (Rab.)
Loiselet, J., 327 (B.R.)
van Loon, F. H. G., 824 (Misc.)
Lopes, A. J., with Strada, 960 (S.S.)
Lopez, V. J., 375 (Dys.)
Lopez Prior, A., 288 (Pel.)
Lopez-Rizal, L., with Fajardo & Padua, 284 (Mal.)
——, Gutierrez, P., & Fernandez, L., 296 (Y. & S.)
——, & Sellards, A. W., 302 (Y. & S.)
Lortat-Jacob & Morlass, 218 (Lep.)
Losey, R. R., with Berens, 477 (Oph.)
Lottico, S., with Crócco, (922) (Lep.)
Loubser, J. N. W., 437 (Z.)
Loukianoff, W. A., with Yakimoff, Galouzo, & Rastégaiff, 873 (Z.)
Lovewell, C. H., 758 (Mal.)
Low, G. C., 212, 911 (Lep.), 995 (Hel.)
——, & Cooke, W. E., 632 (K.A.)
——, & Sayers, E. G., 632 (K.A.)
Löwenberg, K., 763 (Rab.)
Lubinski, with Prausnitz, 712 (Jaun.)
Lubinski, H., 226, 230 (Rab.)
Ludlow, A. I., 355 (Am.), 999 (Hel.)
Luis Carrera, J., 545, 552 (Lep.)
Lumbroso, U., with Durand, 244 (Misc.)
——, with —— & Anderson, 245 (Misc.)
——, with Nicolle, 244 (Misc.), 1013 (Oph.)
Lupu, N. G., & Missirliu, V., (759) (Mal.)
Lussich-Matkovich, V., 1014 (Oph.)
Lustig, A., (40) (Pl.)
Lutrario, A., 1011 (Oph.)
Lyautey, (73) (Misc.)
Lynch, Jr., F. B., with Hayman, Jr., 708 (Jaun.)
Lyssenko, B., 511 (Hel.)

**M**

MacArthur, W. P., (40) (Pl.), 334, 349 (Hist.)
McCall-Smith, N., & Fraser, D. M. M., 802 (Dys.)
MacCallan, A. F., 474 (Oph.)
McCallum, F., with Cumpston, 929 (Pl.)
——, & Dwyer, J. P., 627 (Fev.)
McCarrison, R., 676 (Misc.)
McCord, J. B., 233 (Misc.)
McCulloch, W. E., 864 (Z.), 976 (Hel.)
McDermott, E. N., with Mackie, 93 (Fev.)
MacDonagh, E. J., 526 (Hel.)
McDonald, W. M., 771 (B.R.)
Macdowell, T. W., with Riding, 687 (R.F.)
Machado, L., with Orsini, 833 (Misc.)
McHattie, C., with Chadwick, 648 (K.A.)
Machwiladse, N., 292 (Pel.)
Maciel, H., 274 (Mal.), 519, 542 *bis* (Hel.)
McIlhenny, P. A., 553 (Lep.)
MacInnes, A., 901 (Z.)
McIntosh, J. A., 314 (G.V.)
MacKay, A. G., 957 (S.S.)
McKay, S., 897 (Z.)
McKendrick, A. G., 222, 483, 760 (Rab.)
McKenzie, A., 755 (Mal.)
Mackerras, I. M., 876 (Z.)
Mackie, F. P., with Fairley, 175 (Hel.)
Mackie, T. J., with Herzfeld, 93 (Fev.)
——, & McDermott, E. N., 93 (Fev.)
Maclean, G., 563, 954 (S.S.)
MacLeod, J. M. H., 212, 911 (Lep.)
McLoon, M., with Zahorsky, 869 (Z.)
Macmillan, R. J. A., 653 (Bl.)
McNaughton, J. G., 305 (Y. & S.)
MacQueen, J., 736 (Mal.)
Madan, K. E., 480 (Oph.)
Madras, 1019 (Oph.)
Magath, T. B., & Brown, P. W., 989 (Hel.)
——, & Sheard, C., 848 (Misc.)
Magli, P., 841 (Misc.)
Maire, G., & Pinto, D., 908 (Lep.)
Maitra, G. C., with Tomb, 460 *bis* (Chl.)
Majer, J., 757 (Mal.)
Makhviladzé, N., & Didebuladze, 509 (Hel.)
——, & Dideboulidzé, G., 543 (Hel.)
Malagueta, I., 729 (Mal.)
——, & Sampaio, O., 834 (Misc.)
Malaria Bureau No. 4 Health Bulletin No. 12, (903) (Z.)
Malayan Medical Journal, 704 (Jaun.)
Mallik, K. L. B., 29 (Dys.), 261 (Mal.)
Manabe, E., with Sasaki, 27 (Dys.)
Manalang, C., 194, 195, 201 *bis*, 203, 543, 997, 1006, 1009 (Hel.)
Mandelstamm, M., 731 (Mal.)
Mangalik, V., with Stott, 119 (Fev.)
Mann, W., 795 (Dys.)

Manson, J. S., with Joseph, 803 (Dys.)
Manson-Bahr, P., 53 (Misc.), 212 (Lep.), 697 (R.F.), 741, 746 (Mal.), 775 *bis* (Am.)
——, & Alcock, A., 414 (B.R.)
——, with Andrews, Thomson, Neame, Harvey & Moore, 958 (S.S.)
—— & Sayers, E. G., 650 (Bl.)
Manzoli, G., 790 (Am.)
Marcenac, with Phisalix, 406 (Z.)
Marcenac, M., 407 (Z.)
Marchal, J., with Durham & King, 572 (S.S.)
Marchoux, E., 256 (Mal.), 326 (B.R.), 345 (Hist.)
—— & Quilici, P., 270 (Mal.)
Marcou-Mutzner, 69 (Misc.)
de Mare, N., 115 (Und.)
Margeridon, P., 308, 313 (Y. & S.)
Marie, A. C., 222, 761, 764 (Rab.)
——, & Mutermilch, S., 765 (Rab.)
Marin Amat, M., 481 (Oph.)
Marini, (73) (Misc.)
Marinot, J., with Morin & Advier, 603 (Bb.)
Marquezy, R., with Lesne & Lambling, 247 (Misc.)
Marras, F. M., 456 *bis* (Pl.)
Marrey, P., & Vaz, E., 801 (Dys.)
Marsh, R. G. B., with Rudolf, 752 (Mal.)
Marshall, W., (856 *bis*) (Misc.)
Martin de Nicolas, A., with Tapia, 618 (Und.)
Martin, S. H., 982 (Hel.)
Martinelli, G., (856) (Misc.)
Martini, E., 980 (Hel.), 255, (759), (Mal.), (903), (Z.)
Martins, T., 554 (Lep.)
Maruyama, Y., 39 (Pl.)
Marx, H., 869 (Z.)
Marzinowski, E. I., Pirogow, A. W., & Moschkowski, S. D., (95), (Fev.)
Mashimo, S., (928) (Chl.)
Maslennikowa, W. A., 926 (Chl.)
Massias, C. H., (73) (Misc.)
Mastier, with Aubaret, 476 (Oph.)
Mastrojeni, G., wih Izar, 620 (Und.)
Masucci, A. L., with Nino, 786 (Am.)
Mathis, C., 87 (R.F.)
——, & Galloway, I. A., 87 (R.F.)
Matsumoto, K., 185 (Hel.)
Matsumuro, H., with Fujimaki, 604 (Bb.)
——, with Hara & Takada, (608) (Bb.)
Matsuzawa, K., with Higuchi, Kondo, Haro & Narita, 605 (Bb.)
da Matta, A., 400 *bis* (Z.), 703 (Fev.)
Mattlet, G., 318 (Myc.)
de Mattos, E., 722 (Y.F.)
Mauritius, Rep. Bact. Lab., 818 (Lab.)
Maxcy, K. F., 625 (Fev.)
May, E., 236 (Misc.)
Mayer, M., 137 (K.A.)
——, Borchardt, W., & Kikuth, W., 831 (Misc.)
Mayr, J. K., 748 (Mal.)
Mazza, S., 134, 148, 642, 649 (K.A.), 488, 855 (Misc.)
——, & Arias, J. C., 135 *bis* (K.A.)
——, & Bernasconi, V., 145 *bis* (K.A.)
——, & Cossio Etchecopar, M., 529 (Hel.)
——, & Frías, D., 400, 894 (Z.)
Mazzolani, 601 (Bb.)
Mazzucconi, M., 613 (Und.)
Meerhoff, W., 1012 (Oph.)
Megaw, J. W. D., 837, 839 (Misc.)
Meggitt, F. J., 249 (B.R.)
Mekie, E. C., 437 (Z.)
Meleney, H. E., 844 (Misc.), 884 (Z.)
de Mello, F., 678, 679 (Misc.) (804) (Dys.)
de Mello, F. *et al*, 975 (Hel.)
——, & Alvares, J. M., (544) (Hel.)
——, & Cabral, J., 553, 555 (Lep.)
——, & Camotim, V., 649 (K.A.)
——, & Vernencar, H. M. P., 743 (Mal.)
Mello, U., & Poggio, C., 769 (Rab.)
Melnotte, P., & Farjot, A., 855 (Misc.)
Memmi, G., & Schulemann, W., 739 (Mal.)
——, with Schulemann, 738, 739 (Mal.)
Mendel, K., (285) (Mal.)
Mendelson, R. W., 697 (R.F.), 847, 849 (Misc.)
Mendoza, D., (313) (Y. & S.)
Mengert-Presser, H., & Donath, W. F., 855 (Misc.)
——, with —— & Oudendal, 490 (Misc.)
Menk, W., 4 (Am.), 152 (Misc.)
Merriam, H. E., with Carpenter, 110 (Und.)
Meslay & Cochez, 784 (Am.)
Mesnard, with Bablet & Polidori, 625 (Fev.)
——, with —— & Stéfani, 358 (Am.)
——, Stefani & Le Meillour, 734 (Mal.)
Mesnil, F., 851 (Misc.)
——, with Iwanow, 792 (S.S.)
Messieri, A., 619 (Und.)
Messik, R. E., 647 *bis* (K.A.)
Metalnikov, S., 386 (Z.)
Metzger, E., 152 (Misc.)
Meyer, K. F., & Batchelder, A., 243 (Misc.)
Michalka, J., with Kraus, 224 (Rab.)
Michel, with Trabaud, 787 (Am.)
Miessner, H., & Baars, G., 768 (Rab.)
Mikéladzé, C., 262 (Mal.)
Miller, Jr., H. M., 987 (Hel.)
Miller, L. E., 487 (Misc.)
Miller, N., 189 (Hel.)
Mills, R. G., 976 (Hel.)
Mills, L., 357 (Am.), 481 (Oph.)
Minervin, S., with Frise & Sdrodowskii, 613 (Und.)
Mironesco T., 698 (R.F.)
Mirri, A., 769 (Rab.)
Missirliu, V., with Lupu, (759) (Mal.)
Missiroli, A., 885 (Z.)
Mitchell, J. A., 905 (Lep.)
——, Pirie, J. H. H., & Ingram, A., 722 (B.R.)
Mitra, G. C., with Lloyd & Muir, 558 (Lep.)
Mitrofanova, Y., with Beklemishev, 426 (Z.)
Miyagawa, Y., 520 (Hel.)
Mó, A., with Bosch, 277 (Mal.)
Mochtar, A., with Schüffner, 714 (Jaun.), 721 (Y.F.)
Molesworth, E. H., 208 (Lep.)
Mollaret, P., with Hallè, 783 (Am.)
Momoyeda, S., with Sugimoto, Yasuda, Higuchi & Tanaka, 598 (Bb.)
Monastra-Abate, 872 (Z.)
Money, R. A., 264 (Mal.)
Monier-Vinard, (649) (K.A.)
Montel, R. & Pons, R., 447 (Der.)
Montes, J. E., (73) (Misc.), 127 (Bb.)
Montpellier, J., & Catanei, A., 320 (Myc.), 446 (Der.)
——, & Pinelli, A., 205 (Lep.)
Moore, G. D. F., 305 (Y. & S.)
Moore, J., with Andrews, Manson-Bahr, Thomson, Neame & Harvey, 958 (S.S.)

Moore, V. A., & Carpenter, C. M., 111 (Und.)
Morales Villazón, N., 940 (Pl.)
Morax V., 476 1014 (Oph.)
Moreira, J., 729 (Mal.)
Morenas, with Cade & Ravault, 68 (Misc.)
Morgan, J., 672 (Misc.)
Morgenroth, J., Abraham, L., & Schnitzer, R., 272, (285) (Mal.)
Morin, A., & Genevray, J., 80 (R.F.)
Morin, H. G. S., Advier, M., & Marinot, J., 603 (Bb.)
Morinaka, K., & Ishikawa, S., 188 (Hel.)
Morishima, K., 370 (Dys.)
Morischita, K., & Tsuchimochi, K., 436 (Z.)
Morishita, K., (285) (Mal.)
Moritsch, P., 404 (Z.)
Morlass, with Lortat-Jacob, 218 (Lep.)
Morris, R. M., 383 (Sp.)
Morrison, Jr., O. B., with Logue, 231 (Rab.)
Moschkowski, S. D., with Marzinowski & Pirogow, (95) (Fev.)
Moss, W. L., 306 (Y. & S.)
Mosto, D., & Brachetto Brian, D., (759) (Mal.)
——, with Llambias, 143 *bis* (K.A.)
Motais, with Rigollet, Dumas, Le Dentu, Lasnet & Camail, 160 (B.R.)
Moteki, K., & Kimura, H., (856) (Misc.)
Mouchet, R., 303 (Y. & S.)
Mouriquand, G., 294 (Pel.)
Mtchedlicze, I. Z., 978 (Hel.)
Muelchi, A. F., 493 (Misc.)
Mühlens, P., 12 (Am.), 58 (Misc.), 265 (Mal.), (410) (Z.), (804) (Dys.)
——, Dios, R. L., Petrocchi, J., & Zuccarini, J. A., 682 (B.R.)
——, & Fischer, O., 738 (Mal.)
Muir, E., 217, 904 *bis* 911 (Lep.)
——, with Lloyd & Mitra, 558 (Lep.)
Müller, H., & van Waveren, W. F. J., 827 (Misc.)
Muller, L., 26 (Dys.)
Müller, R., 348 (Hist.), 439 (Z.)
Mumford, E. P., 430 (Z.)
Muniz, J., 967 *bis* (S.S.)
——, with da Fonseca, 396 (Z.)
Münnich, G., 49 (Ent.), 181 (Hel.)
Murakami, K., 368 (Dys.)
Murat, E., 755 (Mal.)
Murata, S., with Odaka & Nagao, 513 (Hel.)
Muratowa, A., 281 (Mal.)
Muraz, (73) (Misc.)
Murphy, R. A., 253 (Mal.)
Murray, H. E., 534 (Hel.)
Murray, W. A., with Pirie, 454 (Pl.)
Musconi, L., 432 (Z.)
Mutermilch, S., with Marie, 765 (Rab.)
Muzii, M., 533 (Hel.)
Myers, J. G., 894 (Z.)

**N**

Nabarro, D., 367 (Dys.)
Nagano, K., 171, 513 (Hel.)
Nagao, S., with Odaka & Murata, 513 (Hel.)
Nagayo, M., 624 (Fev.)
Nägelsbach, E., 551 (Lep.), 824 (Misc.)
Naidu, B. P. B., & Shamsher Jang, 455, 457, 939 (Pl.)
Naito, K., with Shimamura, 606 (Bb.)
Nanhorya, H. B. D., 188 (Hel.)
Napier, L. E., 135 (K.A.), 672 (Misc.)
——, & Foster, P., 636 (K.A.)
——, & Smith, R. O. A., 638 (K.A.)
Narayana Rao, B. K., 478 (Oph.)
Narita, S., with Higuchi, Kondo, Hara & Matsuzawa, 605 (Bb.)
Naróg, F., 475 (Oph.)
Nauck, E. G., (759) (Mal.), 875 (Z.)
——, & Shan Yu, 162 (Hel.)
Navarro, R. J., 296 (Y. & S.)
Navarro, R., with Sison, A. G., Sison, A. B. M., & Ignacio, 678 (Misc.)
Nazareth, S., Gracias, E., & d'Araujo, A., 547 (Lep.)
Neame, H., 1018 (Oph.)
——, with Andrews, Manson-Bahr, Thomson, Harvey & Moore, 958 (S.S.)
Nedergaard, N., 59 (Misc.)
Negro, F., (759) (Mal.)
Nejrotti, M. G., 448 (Der.)
Neveu-Lemaire, M., 164 (Hel.), 863 (Z.)
——, with Germain, 439 (Z.)
Newman, R. E. U., & Davies, R. M., 14 (Am.)
Nicaud, P., 318 (Myc.)
Nicholas, M. J., with Cunningham & Lahiri, 229 (Rab.)
Nicholls, L., & Burgess, E., (51) (Ent.), 766 (Rab.)
Nicholson, D., with Cameron, 494 (Misc.)
Nicol, W. D., 751 (Mal.)
Nicolas, C., 834 (Misc.)
——, & Delgado, L. B., 551 (Lep.)
Nicolas, E., 482 (Oph.)
de Nicolas, M., with Tapia 113 (Und.)
Nicolau, S., 693 (R.F.)
——, with Levaditi & Galloway, 569 (S.S.)
——, with ——, & Schoen, 760 (Rab.)
Nicole, J. E., & Steel, J. P., 280 (Mal.)
——, with ——, 750 (Mal.)
Nicolle, C., 58 (Misc.), (149) (K.A.), 1013 (Oph.)
——, & Anderson, C., 77 *bis* (R.F.), 134 (K.A.)
——, & Conseil, E., 451 (Der.)
——, & Lumbroso, U., 244 (Misc.), 1013 (Oph.)
Nieschulz, O., 889 (Z.)
Nigeria, 158 (Misc.)
Nigeria, Ann. Rep. Med. Res. Inst., 815 (Lab.)
Nikanoroff, S. M., 935 (Pl.)
Nikanorov, S. & Knizaevsky, A., 936 (Pl.)
Nikanorow, S. M., 933 (Pl.)
Nikitinsky, with Adova & Sebenzow, 883 (Z.)
Niles, G. M., 58 (Misc.)
Ninaud, 719 (Y. F.)
Niño, F. L., 592 *bis*, 593, 967 (S.S.)
——, & Masucci, A. L., 786 (Am.)
——, with Parodi, 28 (Dys.), 393 (Z.)
Nishigori, M., 985 (Hel.)
——, with Faust, 512 (Hel.)
Nissle, A., 368 (Dys.)
van Nitsen, R., 362 (Am.)
Nitzulescu, V., 429 *bis* (Z.)
Nobechi, K., 470 *bis* (Chl.)
Nochell, W., 758 (Mal.)
Noguchi, H., 120, 121, 622, 623 *bis* (Fev.), 139 (K.A.), 246 (Misc.), 1013 (Oph.)
—— & Tilden, E. B., 139 (K.A.)
Nojima, T., with Osawa, 918 (Lep.)
Normet, 62 (Misc.)
Norris, V. H., 625 (Fev.)
Nottebaum, (544) (Hel.)

de Novaes e Silva, S., 918 (Lep.)
Novaro, R., 524 (Hel.)
Núñez, S., 57 (Misc.)

**O**

Oba, T., (544) (Hel.)
Occhipinti, G., 262 (Mal.)
O'Connor, F. W., 379 (Dys.)
Odaka, Y., Murata, S., & Nagao, S., 513 (Hel.)
O'Farrell, W. R., with Smith, 515 (Hel.)
Ogata, S., 188, 203, 1002 (Hel.)
Ogata, T., (608) (Bb.)
Ogilvie, W. H., (928) (Chl.)
Ohashi, M., 763 (Rab.)
Ohsumi, S., with Futaki, Takaki, Taniguchi, Ishiwara & Ohtawara, 702 (Fev.)
Ohtawara, T., with Futaki, Takaki, Taniguchi, Ohsumi & Ishiwara, 702 (Fev.)
Ohtsubo, I., with Takano & Inouye, 463 (Chl.)
Oi, T., 1005 (Hel.)
Oiso, T., & Kawanishi, K., 1005 (Hel.)
Okada, J. K., (903) (Z.)
Okada, S., (608) (Bb.)
——, & Sakurai, E., 607 (Bb.)
Oldt, F., 984 (Hel.)
O'Leary, P. A., Goeckerman, W. H., & Parker, S. T., 279 (Mal.)
Oleinikov, S. V., 978 (Hel.)
Olivier, J., 55 (Misc.)
Oméliansky, W., with Zabolotny, 455 (Pl.)
Omori, K., 598 (Bb.)
Ongkiehong, H. F., 804 (Dys.)
Onomura, Y., 371 (Dys.)
Onorato, R., 239, 827 (Misc.), 443 (Der.), 513 (Hel.)
Opitz, with Leichtentritt, 589 (S.S.)
Orenstein, A. J., with Fischer, 1004 *bis* (Hel.)
Orsini, O., & Machado, L., 833 (Misc.)
Ortlepp, R. J., 529 (Hel.)
Osawa, Y., & Nojima, T., 918 (Lep.)
Oshima, F., with Hayashi, Eguchi & Hozumi, 624 (Fev.)
von Ostertag, 226 (Rab.)
Ota, M., 442 (Der.)
Otten, L., 243 (Misc.)
——, & Kirschner, L., 800 *bis* (Dys.)
Ouchakow, W. G., 766 (Rab.)
Oudendal, A. J. F., 185, 536 (Hel.), 283 (Mal.)
——, with Donath & Mengert-Presser, 490 (Misc.)
——, with Kehrer, 541 (Hel.)
Owen, H. B., 482 (Oph.)
Ozaki, Y., & Asada, J., 173 *bis* (Hel.)
Ozoux, M., 1005 (Hel.)

**P**

di Pace, I., 757 (Mal.)
Pacheco, G., 375 (Dys.)
Padilla, T., 258 (Mal.)
Padua, R. G., 284 (Mal.)
——, with Fajardo & Lopez-Rizal, 284 (Mal.)
——, with Rizal, 187 (Hel.)
Pages, A., with Sergent, Et. & Gueidon, 648 (K. A.)
Paget, H., (544) (Hel.)
Pagniez, P., 99 (Jaun.)
Pais, L., 919 (Lep.)
Pal, B. D., 22 (Am.)
Palavandoff, G. B., & Weinberg, B. G., 222 (Rab.)
Paldrock, A., (221), 557, 921, 922 (Lep.)
——, & Rängel, A., 917 *bis* (Lep.)
Palmer, F. J., 218 (Lep.), (928) (Chl.)
Pampana, E. J., 688 (R.F.)
Panayotatou, A., 70, 154, 247 (Misc.), 360 (Am.)
Panine, L. G., with Gloukhoff, Wolkowa & Eroussalimtchique, 372 (Dys.)
Pantaleoni, P., 543 (Hel.)
Paolini, R., 359 (Am.)
Papamarku, P., 964 (S.S.)
Papandrea, F., 163 (Hel.)
Paradiso, F., 131 (K.A.)
Parás, E. M., 922 (Lep.)
Pardo, J. M., 11 (Am.)
Parker, S. T., with O'Leary & Goeckerman, 279 (Mal.)
Parodi, S., & Niño, F. L., 28 (Dys.), 393 (Z.)
Parodi, S. E., 834 (Misc.)
Parrot, L., (410), 430 (Z.)
——, & Donatien, A., 141, 647 (K.A.)
——, & Foley, H., (149) (K.A.)
——, & Lestoquard, F., 147 (K.A.)
——, with Sergent, Edm. & Et., Donatien & Béguet, 140, 649 (K.A.)
——, with ——, & Foley, 641 (K.A.)
——, with Sergent, E., Donatien & Lestoquard, 387 (Z.)
de Pascalis, F., 237 (Misc.)
Paso, J. R., 35 (Pl.)
Patané, C., 885 (Z.)
Patarino, G. B., 148 (K.A.)
Paterson, G., 146 (K.A.)
——, & Shannon, R. C., 430 (Z.)
Paterson, G. C., 889 (Z.)
——, with Bernasconi, 643 (K.A.)
——, & Shannon, R. C., 889 (Z.)
Patton, W. S., 419 (Z.)
——, & Hindle, E., 130, 639 (K.A.), 389, 428 (Z.)
——, with ——, 137, 138, 639 (K.A.)
——, with —— & Hou, 138 (K.A.)
Paul, F., 981 (Hel.)
——, & Schweinburg, F., 760 (Rab.)
Paulson, M., & Andrews, J. M., 866 (Z.)
Pavia, G., 868 (Z.)
Pavlovsky, E. N., 164 (Hel.)
——, & Stein, A. K., 895 *bis* (Z.)
Pawan, J. L., 10 (Am.), 29 (Dys.), 67, (73) (Misc.), 999 (Hel.)
Pawlowa, O. N., 980 (Hel.)
Pawlowsky, E. N., 327 (B.R.)
Payne, F. K., with Payne, 829 (Misc.)
Payne, G. C., & Payne, F. K., 829 (Misc.)
Peacock, A. D., 433 (Z.)
Peall, G. H., with Ross, 662 (Bl.)
Pearse, A. S., with Hausheer & Herrick, 197 (Hel.)
Pearson, G. H., 829 (Misc.)
Pearson, M. G., 373 (Dys.)
Peck, S. M., with Kingsbury, 316 (G.V.)
Peco, G., with Escudero, P., & Escudero, A., 522 (Hel.)
Pellé, A., 697 (R.F.)
de Peñalva Torino, T. D., (759) (Mal.)
Pereira, J. R., 408, (410) (Z.)
Pérèkropoff, G. I., (410) (Z.)
Pérèkropoff, G. J., 276, 749 (Mal.), 659 (Bl.)

Perera, D., 201 (Hel.)
Pergher, G., 223 (Rab.)
Pernet, G., 911 (Lep.)
Peroni, G., 744, (759) (Mal.)
Peruzzi, M., 43 (Chl.), 67 (Misc.)
Perves, 627 (Fev.)
Pessoa, S B., & Corrêa, C., 871 (Z.)
——, with Gomes, 699 (R.F.)
——, with Prado, 725 (Mal.)
——, da Silveira, G. F., & Corrêa, C., 523 *bis* (Hel.)
Petot, C., with Debré, 809 (Pel.)
Petraroia, M., 238 (Misc.)
Petridis, P. A., 21, 22, 785 (Am.)
Petrie, G. F., 796 (Dys.)
Petrocchi, J., with Mühlens, Dios & Zuccarini, 682 (B.R.)
Pettit, A., 98 (Jaun.)
Peyre, E., 246 (Misc.)
Peyre, E. L., 783 (Am.)
Peyrot, J., 90 (R.F.), 732 (Mal.)
Phillips, J., 247 (Misc.)
Phisalix & Marcenac, 406 (Z.)
Pickard, R. J., 780 (Am.)
Pierini, L. E., 549 (Lep.)
Pierson, M., with Levy, 179 (Hel.)
Pigoulewsky, S. W., 981 (Hel.)
Pilcz, A., 754 (Mal.)
Pineda, E. V., 908 (Lep.)
——, & Roxas-Pineda, E., 214 (Lep.)
Pinelli, A., with Montpellier, 205 (Lep.)
Piney, A. 774 (B.R.)
Pinto, C., 430 (Z.)
Pinto, D., with Maire, 908 (Lep.)
Pinto, F. da S., with Prates, 525 (Hel.)
Pires, W., 729 (Mal.)
Pirie, J. H. H., with Ingram, 37 (Pl.)
——, with Mitchell & Ingram, 772 (B.R.)
——, & Murray, W. A., 454 (Pl.)
Pirogow, A. W., with Marzinowski & Moschkowski, (95) (Fev.)
Pirot, R., 628 (Fev.)
Pittaluga, G., 640 (K.A.)
Piza, W., with Povoa, 729 (Mal.)
Placidi, L., with Costa & Boyer, 766 (Rab.)
Plantureux, E., 222, 227 *bis*, 228, 231, 766 (Rab.)
Plaut, A., (544) (Hel.)
Plaut, F., 82 (R.F.)
Plavtov, K. A., 509, 514 (Hel.)
Plehn, A., 669 (Bl.), 278, 732 (Mal.)
Plummer, B. A., (608) (Bb.)
Poche, F., 249 (B.R.)
Podiapolsky, V. P., with Scriabin, Sankin & Limtcher, 982 (Hel.)
——, with —— & Schoultz (1010) (Hel.)
Poggio, C., with Mello, 769 (Rab.)
Poleck, 757 (Mal.)
Polidori, with Bablet & Mesnard, 625 (Fev.)
Polychroniades, G., 738 (Mal.)
Pons, R., (40) (P.)
——, with Bablet, Guérin & Lalung-Bonnaire 602 (Bb.)
——, with Bernard & Lalung-Bonnaire, 602 (Bb.)
——, & Borel, E., 126 (Bb.)
——, & Chastel, 218 (Lep.)
——, & Lalung-Bonnaire, 603 (Bb.)
——, with Montel, 447 (Der.)
Popesco, C., 46 (Chl.)
Popoff, P. P., 977 (Hel.)
Popov, P., 443 (Der.)
Popova, S., 480 (Oph.)
Popow, P., with Wail & Prjadko, 186 (Hel.)
Popowski, S., with Brokman, 26 (Dys.)
Porter, A., 987 (Hel.)
Posey, W. C., 1012 (Oph.)
Postmus, S., with Sardjito, 711 (Jaun.)
Póvoa, H., & Piza, W., 729 (Mal.)
Prado, A., 427 (Z.)
——, & Pessoa, S. B., 725 (Mal.)
Prates, M. M., & Pinto, F. da S., 525 (Hel.)
Prausnitz, C., & Lubinski, 712 (Jaun.)
v. Preisz, H., 457 (Pl.)
Priest, R., 183 (Hel.)
Prigge, R., 81 (R.F.)
Pringle-Patterson, A. E. S., 247 (Misc.)
Prjadko, F., with Wail & Popow, 186 (Hel.)
Proceedings of the Royal Society of Medicine, 911 (Lep.), 958 (S.S.)
Procter, R. A. W., 841 (Misc.)
Proctor, A. H., 266 (Mal.)
Proescher, F., & Arkush, A. S., 671 (Misc.)
——, Ryan, F., & Krueger, A. P., 322 (Myc.)
Prommas, C., 985 (Hel.)
Puckett, C., 729 (Mal.)
Puente, J. J., 208 (Lep.)
Puiggari, I., with Fuchs, Ferro & Cramer, 1012 (Oph.)
Pullè, F., 789 (Am.)
Puntoni, L., 770 (Rab.)
Puntoni, V., 227 *bis*, 228, 765, 770 (Rab.)
Pupo, A., 207, 546 (Lep.)
Pupo, J. A., 145 *ter* (K.A.)
Pupo, J. de A., 219 (Lep.)
Puscariu, E., 476 (Oph.)
——, & Lazaresco, E., 1013 (Oph.)
Pussard, R., with Régnier, 242 (Misc.)

**Q**

Quéméner, E., 362 (Am.)
Quilici, P., with Marchoux, 270 (Mal.)
Quintana, H., & Alvarez Soto, N., 269, (759) (Mal.)
——, with ——, (758) (Mal.)

**R**

Rabit, with Hudelo, 825 (Misc.)
Rackemann, F. M., & Stevens, A. H., 988, (Hel.)
Radojičič, M. M., 738 (Mal.)
Radsma, W., 495 (Misc.)
Raetz, E., 146 (K.A.), 731 (Mal.)
Rajan, R. S., 238 (Misc.)
Raman, T. K., 629 (K.A.)
Raméry, 202 (Hel.)
Ramirez, J., with Schöbl, 302 (Y. & S.)
Ramón y Fañanás, J., 767 (Rab.)
Ramond, F., & Zizine, P., (73) (Misc.)
Ramos Báez, P., with Hoffmann, 209 (Lep.)
Ramos Mejia, C., 769 (Rab.)
Ramsay, J. C., with Rudolf, 279 (Mal.)
Rangel, A., with Paldrock, 917 (Lep.)
Rangel, D. M., 917 (Lep.), (940) (Pl.)
Rangel, M., 206, 220 *bis* (Lep.)
——, with da Rocha, 61 (Misc.)
Rastégaïff, E. F., with Yakimoff, Galouzo & Loukianoff, 873 (Z.)

Rattray, M. J., (544) (Hel.)
Raúl Goyena, J., 275 (Mal.)
Ravina, A., 760 (Rab.)
Ravault, P., with Cade & Morenas, 68 (Misc.)
Ravaut, P., 497 (B.R.)
Rawson, P. H., with Lloyd & Johnson, 891 (Z.)
Ray, J. C., 466 (Chl.)
Raynal, 454 (Pl.)
Raynal, J., 742 (Mal.)
Raynal, M. J., (40) (Pl.)
Raynaud, L., 515 (Hel.), 609 (Und.)
Reategui, J. V., 747 (Mal.)
Rebuffat, E., 307 (Y. & S.)
Reed, A. C., 53 (Misc.)
Rega, M., (285) (Mal.)
Regendanz, P., & Kilkuth, W., 973 (S.S.)
——, & Tropp, C., 971 (S.S.)
Régnier, R., & Pussard, R., 242 (Misc.)
Rehbein, M., 11 (Am.)
Reichenow, E., 353 (Am.)
Reisinger, E., 177 (Hel.)
Reitano, R., 734 (Mal.)
Reiter, H., 241 (Misc.)
Reitler, R., 745 (Mal.)
Remlinger, P., 163 (Hel.), 760, 762 (Rab.)
——, & Bailly, J., 761, 764, 766 *bis* (Rab.)
——, with Charrier, (758) (Mal.)
Rennescu, N., with Ballif & Reznic, 293 (Pel.)
Renzo, A., (940) (Pl.)
Repetto, R., 666 (Bl.)
Repper, E. N. D., 42 (Chl.)
Revue de Médecine et d'Hygiène Tropicales, 718 (Y.F.)
Reynaud, G., 69 (Misc.)
de Rezende, M. O., 644 (K.A.)
Reznic, A., with Ballif & Rennescu, 293 (Pel.)
Rhamy, B. W., 323 (Myc.)
Rhodes, W. F., 373 (Dys.)
Rice, E. M., 1009 (Hel.)
Richardson, S., 626 (Fev.)
Richert, G., 810 (Pel.)
Rickard, E. R., & Kerr, J. A., 539 (Hel.)
Rico, J. T., 533 *bis*, 543 *ter* (Hel.)
Riding, D., & Macdowell, T. W., 687 (R.F.)
Rigollet, Motais, Dumas, R., Le Dentu, R., Lasnet & Camail, 160 (B.R.)
Riley, W. A., & Watson, C. J., 68 (Misc.)
Rippon, T. S., 1019 (Oph.)
Riva, A., with de la Barrera, 978 (Hel.)
Rizal, L. L., & Padua, R. G., 187 (Hel.)
Rizzo, C., 987 (Hel.)
Robertson, A., with Thomson, 576 (S.S.)
Robertson, R. C., & Anning, C. C. T., (928) (Chl.)
Robic, J., with Girard, 762 (Rab.)
Robinson, E. M., 578 (S.S.)
Robitschek, W., 529 (Hel.)
da Rocha, F., & Rangel, M., 61 (Misc.)
Rochaix, A., 761, 766 (Rab.)
Rockefeller Foundation, 1023 (B.R.)
Rodenwaldt, E., 422 (Z.)
Rodhain, J., 396 *bis*, 399, 872 (Z.)
Rodriques, J. S. N. H., 509 (Hel.)
Rodriguez, J. N., 210, 550 (Lep.)
Roegholt, M. N., 751 (Misc.)
Roehl, W., 264, 738 (Mal.)
Roffo, A. H., 555 (Lep.)
Roger, H., 112 (Und.)
Rogers, L., 41, 924 (Chl.), 212, 911 (Lep.)
Rohardt, W., (940) (Pl.)
de Roma, G., 261 (Mal.)
Roman, B., & Burke, A., 519 (Hel.)
Romero Sierra, J. M., 496 (Misc.)
Ronnefeldt, F., 758 (Mal.)
Root, F. M., 423, 884, 885 (Z.)
Rose, F. G., 186 (Hel.)
Rosenberg, E., with Schnitzer, 571 *bis* (S.S.)
Rosenholz, H. P., 685 (R.F.)
Ross, G. R., & Peall, G. H., 662 (Bl.)
Ross, I. C., 489 (Misc.)
Ross, J. A., (73) (Misc.)
Rossi, P., 429 (Z.)
——, with Senevet, 436 (Z.)
Rossignoli, J. J., 902 (Z.)
Roth, E. J. H., 180 (Hel.)
Roubaud, E., & Colas-Belcour, J., 885, 888, (Z.)
Roukhadzé, N., 427 (Z.), 727 (Mal.)
Row, R., 53 (Misc.)
Row, Y. S., 534 (Hel.)
Roxas-Pineda, E., with Pineda, 214 (Lep.)
Roxburgh, A. C., 900 (Z.)
Roxo, H., 729 (Mal.)
Roy, A. C., 273 (Mal.)
Roy, D. N., 879 (Z.)
Royer, M., 407 (Z.)
Roznatovsky, J. P., 109 (Und.)
Rubino, M. C., 215, 557 (Lep.)
Ruder, F. B., 721 (Y.F.)
Rudolf, G. de M. & Marsh, R. G. B., 752 (Mal.)
——, & Ramsay, J. C., 279 (Mal.)
Ruh, H. O., with Dembo, Fargo & Taylor, 93 (Fev.)
Rukawischnikoff, E., 826 (Misc.)
Russell, A. J. H., (47) (Chl.)
——, & Sundararajan, E. R., 923 (Chl.)
Russell, E. V., 734 (Mal.)
Russell, F. F., 1023 (B.R.)
Russell, P. F., with Barnes, 192, 544 (Hel.)
Russian Journal of Tropical Medicine, 255 (Mal.)
Russo, V., 703 (Fev.)
Ruys, A. C., 94 (Fev.)
Ryan, F., with Proescher & Krueger, 322 (Myc.)

S

Sabrazès, J., 304 (Y. & S.), 710 (Jaun.)
Sack, A., 850 (Misc.)
Saiki, T., 857 (B.R.)
Sailer, J., 100 (Jaun.)
Saisawa, K., & Tanabe, B., 23, (381) (Dys.)
Saito, M., 189 (Hel.)
Saito, S., with Fujii & Shionoya, 203 (Hel.)
Sakamoto, T., with Irisawa, (608) (Bb.)
Sakurai, E., with Okada, 607 (Bb.)
Sakurai, H., 557, 920 (Lep.)
Salvati, 475 (Oph.)
Sambon, L. W., (544) (Hel.)
Sampaio, O., with Malagueta, 834 (Misc.)
Samsonov, P. S., 80 (R.F.)
Sanarelli, G., 698 *bis* (R.F.)
Sandground, J. H., 184 *bis*, 185 (Hel.)
Sanfilippo, E., 615 (Und.)
——, with Ascoli, 615 (Und.)
Sangiorgi, G., 616 (Und.)
Sanguinetti, L. V., with Bonorino Udaondo, 263 (Mal.)

Sankin, with Scriabin, Podiapolsky & Limtcher, 982 (Hel.)
Santra, I., 905 (Lep.)
Sanyal, C. C., 634 (K.A.)
Sappington, H. O., 729 (Mal.)
Sardjito, M., 25, 27, 372 (Dys.)
——, & Postmus, S., 711 (Jaun.)
Sarkar, S. L., 238 (Misc.)
Sartory, A., & Sartory, R., 441 (Der.)
Sartory, R., with Sartory 441 (Der.)
Sasaki, R., 1001, (Hel.)
——, & Manabe, E., 27 (Dys.)
Sata, A., 924 (Chl.)
Sato, S., 399 (Z.)
Sautet, J., 19 (Am.)
——, with Carvaillo, 18 (Am.)
Savage, P., 264 (Mal.)
Savateef, A., 241 (Misc.)
Savery, H. M., with Hardym, 702 (Fev.)
Savino, E., 584 (S.S.)
Sawada, T., with Takagi & Segi, 713 (Jaun.)
Sayers, E. G., with Low, 632 (K.A.)
——, with Manson-Bahr, 650 (Bl.)
Scanlon, R. W., 553 (Lep.), 644 (K.A.)
Schadelbauer, Jr., K., 340 (Hist.)
Schapiro, L., (759) (Mal.)
——, & Stoll, N. R., 1009 (Hel.)
Scharff, J. W., (544) (Hel.)
Scharpff, W., & Schneller, 533 (Hel.)
Schern, K., 594 (S.S.), 768, 769 (Rab.)
Schilling-Siengalewicz, S., (680) (Misc.)
Schingarew, N., 424 (Z.)
Schlossberger, H., 1022 (B.R.)
——, with Hartoch & Joffe, 371 (Dys.)
Schlossmann, C., 698 (R.F.)
Schmidt, H. B., 179 (Hel.)
Schmidt-Weyland, P., 765 (Rab.)
Schneider, A., with Elkeles, 24, 792 (Dys.)
Schneider, H., 525 (Hel.)
Schneller, with Scharpff, 533 (Hel.)
Schnitzer, R., 571 *bis* (S.S.)
——, with Morgenroth & Abraham, 272, (285) (Mal.)
——, & Rosenberg, E., 571 *bis* (S.S.)
——, & Silberstein, W., 571 (S.S.)
Schnürer, J., & David, H., 769 (Rab.)
Schöbl, O., 369 (Dys.), (680) (Misc.)
——, & Ramirez, J., 302 (Y. & S.)
——, Sellards, A. W., & Lacy, G. R., 300 (Y. & S.)
——, with —— & ——, 297 (Y. & S.)
——, & Villaamil, R., 24 (Dys.)
Schoen, R., with Levaditi & Nicolau, 760 (Rab.)
Schopfer, W. H., (204) (Hel.)
Schoultz with Scriabine & Podyapolska (1010) (Hel.)
Schoute, E., with de Buch & Swellengrebel, 879, 880 (Z.)
Schreuder, J. J. C., 549 (Lep.)
Schreus, H. T., 694 *bis* (R.F.)
——, & Weisbecker, H., 84 (R.F.)
Schröpl. E., 452 (Der.), 535 (Hel.)
Schüffner, 709 (Jaun.)
Schüffner, W., 537 (Hel.)
——, & Mochtar, A., 714 (Jaun.), 721 (Y.F.)
——, & Sieburgh, G., 709 *bis* (Jaun.)
Schulemann, W., & Memmi, G., 738, 739 (Mal.)
——, with Memmi, 739 (Mal.)
Schumacher, C., 570 (S.S.)
Schumacher, J., 282 (Mal.)
Schur, H., 378 (Dys.)
Schuurmann, C. J., & Schuurmann Ten Bohkel Stuinink, A., 393 (Z.)
Schuurmann Ten Bohkel Stuinink, A., with Schuurmann, 393 (Z.)
Schwartz, B., 189 *bis* (Hel.)
Schwartz, L., 788 (Am.)
Schweinburg, F., with Paul, 760 (Rab.)
Schwenck, J., 997 (Hel.)
Schwetz, J., 501 (B.R.), 876, 893, 898 *ter* (Z.)
Scriabin, K. L., Podiapolsky, V. P., Sankin & Limtcher, L. F., 982 (Hel.)
Scriabine, C. J., & Podyapolska, V. P., & Schoultz, (1010) (Hel.)
Sdrodowskii, P., with Frisc & Minervin, 613 (Und.)
Sealy, G. O. F., 924 (Chl.)
Sebenzow, with Adova & Nikitinsky, 883 (Z.)
Sédan, J., 1015 (Oph.)
Ségal, J., 380, (381) (Am.)
Segi, M., with Takagi & Sawada, 713 (Jaun.)
Segura, G., 777 (Am.)
Seidelin, H., 850 (Misc.)
Séjournant, (903) (Z.)
Selisky, A. B., 449 (Der.)
Sellards, A. W., 720 (Y.F.)
——, & Baetjer, W. A., 787 (Am.)
——, with Lacy, 297 (Y. & S.)
——, ——, & Schöbl, O., 297 (Y. & S.)
——, with Lopez-Rizal, 302 (Y. & S.)
——, with Schöbl & Lacy, 300 (Y. & S.)
——, with Theiler, 709 (Jaun.)
Semenow, G., 980 (Hel.)
——, & Kogan, D., 980 (Hel.)
Semionow, G. M., & Garmatty, K. I., 982 (Hel.)
Sen., A. K., 928 (Chl.)
Sen, P. B., with Brahmachari, 232 (Misc.)
Senevet, G., & Rossi, P., 436 (Z.)
——, & Witas, P., 520 (Hel.)
Sen Gupta, S. C., with Hermitte & Biswas, 30 (Dys.)
Senior-White, R., (285) (Mal.)
——, & Williamson, K., 257 (Mal.)
Séno, R., 541 (Hel.)
Sepulcri, P., 440, 884 (Z.)
Sequeira, J. H., 212, 911 (Lep.)
Serbinov, I. L., 291 (Pel.)
Sergent, E., 812 (Lab.)
——, Parrot, L., Donatien, A., & Lestoquard, F., 387 (Z.)
Sergent, Edm. & Et., Foley, H., & Parrot, L., 641 (K.A.)
——, Parrot, L., Donatien, A., & Béguet, M., 140 (K.A.)
——, ——, ——, & Béguet, M., 649 (K.A.)
Sergent, Et. & Catanei, A., (285) (Mal.)
——, Gueidon, E., & Pagès, A., 648 (K.A.)
Serigós, E., 522 (Hel.)
Serio, F., 283 (Mal.)
Serra, A., 213 (Lep.)
Serravalle, G., with Cremona, 763 (Rab.)
Seshachalam, T., 899 (Z.)
Sette, N., with Alessandrini, 242 (Misc.)
Severn, A. G. M., 421 (Z.), 724 (Mal.)
Seyfarth, C., 76 (B.R.)
Shamsher Jang, with Naidu, 455, 457, 939 (Pl.)
Shanks, G., 10 (Am.)
——, & Khan, G. P., 155 (Misc.)
Shannon, R. C., with Paterson, 430, 889 (Z.)

Shan Yu, with Nauck, 162 (Hel.)
Sharp, N. A. D., 35 (Pl.), 995 *bis* (Hel.)
Shattuck, G. C., Little, H. G., & Coughlin, W. F., 315 (G.V.)
——, with Strong, Bequaert & Wheeler, 324 (B.R.)
Shaw, V. A., 309 (Y. & S.)
Sheard, C., with Magath, 848 (Misc.)
Shelley, H. M., 287, 806 (Pel.)
Shepard, C. A., & Fleming, W. D., 384 (Sp.)
Sherwood, J. W., 900 (Z.)
Shiga, K., 125 (608) (Bb.), 369 (Dys.), 551 (Lep.)
Shillinger, J. E., 979 (Hel.)
——, with Hall, 166, 167 (Hel.)
Shimamura, T., 188 (Hel.)
——, & Naito, K., 606 (Bb.)
Shimazono, J., 598 (Bb.)
Shimizu, T., with Yano, Shirai & Kaneko, 163 (Hel.)
Shimkin, N., 473 (Oph.)
Shionoya, H., with Fujii & Saito, 203 (Hel.)
Shirabe, M., (608) (Bb.)
Shirai, M., 168, 984, 1006 (Hel.)
Shirai, S., with Yano, Shimizu & Kaneko, 163 (Hel.)
Shoetensack, M., with Hachitani & Takita, 466 (Pl.)
Shortt, H. E., 389 (Z.)
——, Barraud, P. J., & Craighead, A. C., 132 *bis*, 133, 134, 636, 638 (K.A.)
——, Craighead, A. C., Chand, K., & Swaminath, C. S., 637 (K.A.)
——, & Swaminath, C. S., 637 (K.A.)
Shrewsbury, J. F. D., with Wilson, 144 (K.A.)
Sicé, A., 455 (Pl.), 977 (Hel.)
Sieburgh, G., with Schüffner, 709 *bis* (Jaun.)
Silberstein, W., with Schnitzer, 571 (S.S.)
Silianski, L., 535 (Hel.)
da Silva, E. P., 224 *bis*, 228, 229, 761 (Rab.)
Silva, F., 443 (Der.)
da Silva, F. V., 508 (Hel.)
da Silveira, G. F., with Pessôa & Corrêa, 523 (Hel.)
Simpson, A. S., 9 (Am.)
Sinclair, T. W., 95 (Fev.)
Singh, Z., with Hodgson & Vardon, 730 (Mal.)
Sinton, J. A., 886 *bis* (Z.)
——, with Christophers, 253 (Mal.)
——, with —— & Covell, 881 (Z.)
Sioli, F., 265 (Mal.)
Sison, A. B. M., & Ignacio, M., 50 (Ent.)
——, with Sison, A. G., Ignacio & Navarro, 678 (Misc.)
Sison, A. G., Sison, A. B. M., Ignacio, M., & Navarro, R., 678 (Misc.)
Sitsen, A. E., 6, 777 (Am.), 850 (Misc.)
Skinner, A. H., 461 (Chl.)
Skorodumoff, A., 34 *quat.* (Pl.)
Sliwensky, M., 738 (Mal.)
Slot, J. A., 322 (Myc.)
Slotwer, B. S., 223 (Rab.)
Small, J. C., 100 (Jaun.)
Smillie, W. G., 256, 729 (Mal.)
Smith, D. T., 695 *bis* (R.F.)
Smith, E. C., 157 (Misc.), 447 (Der.)
——, with Aitken, 717 (Y.F.)
——, with ——, Connal & Gray, 101 (Y.F.)
Smith, F. F. S., 478 (Oph.)
Smith, G., with Warren & Lindner, 612 (Und.)
Smith, G. D., with Baumgartner, 382 (Sp.)
Smith, H., 479, 1017 (Oph.)
Smith, J., with Fraser & Kinloch, 367 (Dys.)
Smith, J. R., 1017 (Oph.)
Smith, R. O. A., with Napier, 638 (K.A.)
Smith, S., & O'Farrell, W. R., 515 (Hel.)
Smithies, F., 150 (Misc.)
Smits, E., with Bärmann, 740 (Mal.)
Smyly, H. J., 136 (K.A.)
Snijders, E. P., 852 (Misc.)
Snyder, J. R., with Gundrum, 525 (Hel.)
Soeprapto, 308 (Y. & S.)
Soesilo, R., 94 (R.F.), 100 (Jaun.), 702 (Fev.)
——, with Walch, 710 (Jaun.), 723 (Mal.)
Soetedjo, 70 (Misc.)
Sofiew, M. S., 871 (Z.)
Sola, E., (759) (Mal.)
Solis, F., 922 (Lep.)
——, with Wade, 909 (Lep.)
Solomon, H. C., Berk, A., Theiler, M., & Clay, C. L., 92 (Fev.)
Soper, F. L., 196, 201, 537, 1006 (Hel.)
Souchard, with Bablet & Advier, 762 (Rab.)
Souloumiac, with Lestage, 1015 (Oph.)
Sourdille, G., with Worms & Lesbre, 366 (Dys.)
South Africa, Union of, 905 (Lep.)
South African Institute for Medical Research, 818 (Lab.)
Southern Medical Journal, 729 (Mal.)
Southwell, T., 988 (Hel.)
Souza, G. H. de P., 596 (B.R.)
Specht, R., 517 (Hel.)
Spencer, R. R., 124 (Fev.)
Speransky, A., 764 (Rab.)
Spiethoff, B., 280 (Mal.)
Spranger, H., 366, 367 (Dys.)
Sta. Cruz, J. Z., with Africa, 988 (Hel.)
Staffieri, D., Giacosa, R. A., & Barralt, R., 997 (Hel.)
Stambuk, D., with Djokič, 738 (Mal.)
Stannus, H. S., 287 (Pel.), 823 (Misc.)
Stanton, A. T., 820 (Lab.)
Steel, J. P., with Nicole, 280, 750 (Mal.)
van Steenis, P. B., 362 (Am.)
——, with den Hartog, 712 (Jaun.)
Stéfani, with Bablet & Mesnard, 358 (Am.)
——, with Mesnard & Le Meillour, 734 (Mal.)
Stein, A. K., with Pavlovsky, 895 *bis* (Z.)
Steiner, G., Henning & Steinfeld, 83 (R.F.)
Steinfeld, with Steiner & Henning, 83 (R.F.)
Stekhoven, Jr., J. H. S., 1009, 1010 *bis* (Hel.)
Stenhouse, H. M., 150 (Misc.)
Stepanov, I. V., 32 (Pl.)
Stepanow-Grigoriew, J., & Hoeppli, R., 527 (Hel.)
Stephens, J. W. W., 655 (Bl.)
Stevens, A. H., with Rackemann, 988 (Hel.)
Sticco, E., 224 (Rab.)
Stieffel, with Emile-Weil, 654 (Bl.)
Stiles, C. W., 200, 536 (Hel.)
——, & Hassall, A., 249 (B.R.)
St. John, J. H., 19 (Am.), 753 *bis* (Mal.)
——, with Craig, 351 (Am.)
Stockman, R., 343 (Hist.)
Stoll, N. R., Cort, W. W., & Kwei, W. S., 981 (Hel.)
——, with Schapiro, 1009 (Hel.)
Stoll, N. W., with Cort, Grant & others, 193 (Hel.)
Stones, R. Y., with Cook, 149 (K.A.)

Stott, H., & Mangalik, V., 119 (Fev.)
Strachan, A. S., 182 (Hel.), 260 (Mal.)
Strada, L., & Lopes, A. J., 960 (S.S.)
Stratman-Thomas, W. K., with Loevenhart, 674 (K.A.)
Strempel, R., & Amuzzi, G., 690, 691 (R.F.)
Strickland, C., 899 (Z.)
——, & Choudhury, K. L., 772 (B.R.)
——, & Chowdhury, K. L., 883 (Z.)
Strong, R. P., 78 (R.F.)
——, Shattuck, G. C., Bequaert, J. C., & Wheeler, R. E., 324 (B.R.)
Strong, W. M., 201 (Hel.)
Struthers, E. B., 136, 634 (K.A.)
Stühmer, A., 582 (S.S.)
Stutzer, M. I., & Abramowitsch, F. E., 321 (Myc.)
Suga, K., with Tadokoro, 25 (Dys.)
Suganuma, S., 531 (Hel.)
Sugimoto, K., 598 (Bb.)
——, Yasuda, Y., Higuchi, M., Momoyeda, S., & Tanaka, S., 598 (Bb.)
——, ——, & Kakegawa, S., 606 (Bb.)
Sukneff, W. W., (940) (Pl.)
Suldey, E. W., 103 (Y.F.), 627 (Fev.), 672 (Misc.)
Sundararajan, E. R., with Russell, 923 (Chl.)
Susman, W., 808 (Pel.)
Sutton, I. C., 286 (Pel.)
Suworow, S. W., (40) (Pl.)
Suzuki, K., 46 (Chl.), 606, 607 (Bb.)
Suzuki, T., 127 (Bb.)
Suzuki, U., 604 (Bb.)
Suzuki, Y., 901 (Z.)
Svensson, R. M., 1007 (Hel.)
——, & Kessel, J. F., 540 (Hel.)
Swaminath, C. S., with Shortt, 637 (K.A.)
——, with ——, Craighead & Chand, 637 (K.A.
Swellengrebel, N. H., 882 (Z.)
——, de Buck, A., & Schoute, E., 880.
——, with —— & ——, 879, 880 (Z.)
——, with Honig, 344 (Hist.)
Swezy, O., with Kofoid & Boyers, 2 (Am.)
Swynnerton, C. F. M., 892 (Z.)

T

Taboury, 472 (Oph.)
Tadokoro, R., & Suga, K., 25 (Dys.)
Tagawa, S., 100 (Jaun.)
Takada, R., with Hara & Matsumuro, (608) (Bb.)
Takagi, S., Segi, M., & Sawada, T., 713 (Jaun.)
Takahira, H., & Ishibashi, E., (608) (Bb.)
——, & Kitagawa, S., 605 (Bb.)
Takaki, I., with Futaki, Taniguchi, Ohsumi, Ishiwara & Ohtawara, 702 (Fev.)
Takano, R., Ohtsubo, I., & Inouye, Z., 463 (Chl.)
Takaya, K., 222, 770 (Rab.)
Takematsu, S., 373 (Dys.)
Takeyama, S., 974 (S.S.)
Takita, J., with Hachitani & Shoetensack, 466 (Pl.)
Talbot, 1011 (Oph.)
Taliaferro, L. G., (410) (Z.)
Taliaferro, W. H., 395, (440), 867 (Z.)
——, & Johnson, T. L., 587 (S.S.)
Tanabe, B., 178 (Hel.)
——, with Saisawa, 23 (381) (Dys.)
Tanaka, S., & Endo, M., 599 (Bb.)
——, with Sugimoto, Yasuda, Higuchi & Momoyeda, 598 (Bb.)
Tanganyika Territory, 892 (Z.), 954 (S.S.)
Taniguchi, T., with Futaki, Takaki, Ohsumi, Ishiwara & Ohtawara, 702 (Fev.)
Tanon, L., & Jamot, E., 268 (Mal.), 833 (Misc.)
——, & Trabaud, 11 (Am.)
Tapia, M., & Martin de Nicolas, A., 618 (Und.)
——, & de Nicolas, M., 113 (Und.)
Tardif, 667 (Bl.)
Tardres, J., 742 (Mal.)
Targowla, R., with Claude & Cénac, 752 (Mal.)
Taylor, A. B., 373 (Dys.)
Taylor, F. E., with Castellani, 677 (Misc.)
Taylor, G. R., with Dembo, Ruh & Fargo, 93 (Fev.)
Taylor, H. A., 729 (Mal.)
Tcher[tch]echtoff, A., 254 *bis* (Mal.)
Tchirkovski, 1012 (Oph.)
Tchourilina, A. A., (940) (Pl.)
Tebbutt, A. H., 211 (Lep.)
Teixeira, E., 264 (Mal.)
Tejera, E., 436 (Z.)
Ter-Grigoroff, H., 108 (Und.)
Ter-Matevosiants, S. M., 865 (Z.)
Terra, F., (559) (Lep.)
Tesio, F., 744 (Mal.)
Testolin, C., & Barralt, R., 782 (Am.)
Tewfik, M., 479 (Oph.)
Thaysen, T. E. H., 384 (Sp.)
Theiler, A., & du Toit, P. J., 386 (Z.)
——, & Sellards, A. W., 709 (Jaun.)
Theiler, M., with Solomon, Berk & Clay, 92 (Fev.)
Theodor, O., with Adler, 142 *bis*, 143, 645 *ter* (K.A.), 887 (Z.)
Theodore, J. H., with Cunningham, 694 (R.F.)
van Thiel, P. H., 173, 199 (Hel.), 438, 883 (Z.)
Thiodet, with Lemaire, 182, 522 (Hel.)
——, with —— & Derrien, 523 (Hel.)
Thiroux, A., 594 (S.S.)
Thompson, G. W., with Tomb, 924 (Chl.)
Thomson, J. G., & Annecke, S., 259 (Mal.)
——, with Andrews, Manson-Bahr, Neame, Harvey & Moore, 958 (S.S.)
——, & Robertson, A., 576 (S.S.)
Thomson, M. D., 17 (Am.), (381) (Am.)
Tiedeman, W. v. D., 724 (Mal.)
Tijssen, J., 1019 (Oph.)
Tikhomirow, J. J., 936 (Pl.)
Tilden, E. B., with Noguchi, 139 (K.A.)
Timmerman, W. A., 708 (Jaun.)
Tinti, M., 230 (Rab.)
Tisseuil, J., 919 (Lep.)
Tochihara, I., 386 (Z.)
Todd, A. T., 316 (C.Bu.)
Toh, S., 980 (Hel.)
Tohyama, Y., 464 (Chl.)
Tomaselli, A., 360 (Am.)
Tomb, J. W, 43, 47 (Chl.), 359 (Am.)
——, & Maitra, G. C., 460 *bis* (Chl.)
——, & Thompson, G. W., 924 (Chl.)
Tommaso, L., 754 (Mal.)
Torikata, R., & Fujimoto, A., 796 (Dys.)
Torres, C. M., 106 (Y.F.)
——, with Villela, 593 (S.S.)
Torrey, J. P., with Huddleson & Hasley, [illegible]19 (Und.)
Torstenson, H., 610 *bis* (Und.)

Torstenson, with Beguet, 610 (Und.)
Tootell, G. T., 177 (Hel.)
Toullec, 206 (Lep.)
Tournier, E., (40), 455 (Pl.)
Trabaud, 352, 356 (Am.), 601 (Bb.)
—— & Michel, 787 (Am.)
——, with Tanon, 11 (Am.)
Trabaud, M., 255 *bis* (Mal.)
Transactions of the Royal Society of Tropical Medicine & Hygiene, 821 (Lab.)
Traut, I. I., 937 *ter* (Pl.)
Travers, E. A. O., 911 (Lep.)
Tréfouël, M. & Mme., with Fourneau & de Lestrange-Trévise, 674 (Misc.)
Treuherz, W., 548, 917 (Lep.)
Triffitt, M., (903) (Z.)
Trocello, E., & Cruto, A., 233 (Misc.)
Tropp, C., with Giemsa & Weise, 272 (Mal.), 399 (Z.)
——, with Regendanz, 971 (S.S.)
Truffi, M., 147 (K.A.)
Tscherikower, R., with Kritschewsky, (701) (R.F.)
Tsuchimochi, K., (204) (Hel.)
——, with Morischita, 436 (Z.)
Tsunashima, Y., (544), 1010 (Hel.)
Tsuyuki, K., with Ando, 173 (Hel.)
Tsuzuki, J., 604 (Bb.)
Tudhope, G. R., with Young, 13 (Am.)
Turcu, T., 748 (Mal.)
Turkhud, D. A., 36 (Pl.)
Turner, A. W., 176 (Hel.)
Turner, R. H., & Jones, P. H., 12 (Am.)
Tuyter, A., 541 (Hel.)
Twells, T. W., 668 (Bl.)

**U**

Ubago, M., 48 *bis* (Ent.)
Uchida, S., 205 (Lep.)
Uemura, Y., (544) (Hel.)
Uganda Protectorate, Ann. Rep. Bact. Dept., 814 (Lab.)
Uhlenhuth & Grossmann, H., 97 (Jaun.)
Uhlenhuth, P., & Herrmann, E., 711 (Jaun.)
Ukil, A. C., 866 *bis* (Z.)
Umeno, S., 767 (Rab.)
Underwood, F. J., 729 (Mal.)
Urchs, O., 363 *bis* (Am.)
Uribe, C., 22 (Am.), 435 (Z.)
Usami, K., 197 (Hel.)

**V**

Vaccarezza, R. F., with Destéfano, 72 (Misc.)
Valenzuela, A. J., 840 (Misc.)
Valerio, A., 534 (Hel.)
Van den Branden, F., 567, 569 *bis* (S.S.), 733 (Mal.), 817 (Lab.), 852 (Misc.)
Van den Hoven van Genderen, J., 767 (Rab.)
Vardon, A. C., with Hodgson & Singh, 730 (Mal.)
Varma, R. L., 644 (K.A.)
Vasile, B., 631 (K.A.)
Vasilieva, A. P., 512 (Hel.)
Vaucel, M., with Ledentu, G., 956, 958, 962 (S.S.)
Vaughan, K., 70 (Misc.)
Vaz, E., 798 (Dys.)
——, with Marrey, 801 (Dys.)
de Vecchi, B., 9 (Am.)
de Vecchi, G., 737 (Mal.)
Vellard, J., 403 (Z.)
——, with Brazil, 402, 406 (Z.)
Veneroni, C., 450 (Der.), 508, 515 (Hel.)
Vercellana, G., 47 (Chl.)
——, with Zanzucchi, 39 (Pl.) 112 (Und.)
Verdelet & Auché, J., 316 (C.Bu.)
Vernencar, H. M. P., with de Mello, 743 (Mal.)
Vernon with Jamot, 961 (S.S.)
Versari, A., 149 (K.A.)
Vervoort, H., 700 (R.F.)
Vestschezerow, N. I., 258 (Mal.)
Viala, J., 766 (Rab.)
Vialard & Darleguy, 8, 779 (Am.)
Vialatte, C., 688 (R.F.)
Vianna, L., 57 (Misc.)
Vidal, J., with Domingo, 50 (Ent.)
Vidal Munné, J., 611 (Und.)
Vidhikar, L. H., 1007 (Hel.)
Vieira, J. P. B., 451 (Der.)
Vilanova, X., & Catasús, J. M., 920 (Lep.)
Villaamil, R., with Schöbl, 24 (Dys.)
Villard with Delard, 1019 (Oph.)
Villegas, C., with Biglieri, 225 (Rab.)
Villela, E., & Torres, C. M., 593 (S.S.)
Vinzent, R., 86, 691 (R.F.), 713 (Jaun.)
Visher, J. W., 698 (R.F.)
Viswalingam, A., 288 (Pel.)
Viswanathan, A., 267 (Mal.)
Vitug, W., 604 (Bb.)
Viton, J. J., Cruciani, J. A., & Vivoli, D., 698 (R.F.)
Vivoli, D., with Viton & Cruciani, 698 (R.F.)
Vogel, H., 365 (Am.), 531 (Hel.), 898 (Z.)
Voitel, K. H., 280 (Mal.)
Voizard, F., 263 (Mal.)
Volpino, G., 295 (Pel.)
—— & Finocchio, M., 228 (Rab.)
Voskressenski, B., 254 (Mal.)

**W**

Wachowiak, M., with Kotkis & Fleisher, 319 (Myc.)
Wada, H., 401, 405, 900 (Z.)
Wade, H. W., 556 (Lep.)
——, & Lara, C. B., 909, 911 (Lep.)
——, & Solis, F., 909 (Lep.)
Wagener, E. H., & Koch, D. A., 138 (K.A.)
Wagner, J. A., 894 (Z.)
Wagner, J., & Joff, I., 33 (Pl.)
Wagner-Jauregg, J., 278 (Mal.)
Wail, S. S., Popow, P., & Prjadko, F., 186 (Hel.)
Walch, E. W., & Soesilo, R., 710 (Jaun.), 723 (Mal.)
Waldorp, C. P., 268, 745 (759) (Mal.)
—— & Bordo, C. A., 735 (Mal.)
Walker, H. M., 152 (Misc.)
Walker, J. H. C., 998 (Hel.)
Wallington, K. T. K., 669 (Bl.)
Walton, C. L., & Wright, W. R., 440 (Z.)
Ward, G., 383 (Sp.)
Warren, C. W., Smith, G., & Lindner, M. B., 612 (Und.)
Watanabe, K., 646 (K.A.)
Watkins, A., 901 (Z.)
Watson, C. J., with Riley, 68 (Misc.)

van Waveren, W. F. J., with Müller, 827 (Misc.)
Weinberg, B. G., with Palavandoff, 222 (Rab.)
Weinberg, M., 72 (Misc.)
Weisbecker, H., with Schreus, 84 (R.F.)
Weise, K., 801 (Dys.)
Weise, W., with Giemsa & Tropp, 272 (Mal.), 399 (Z.)
——, with Kudicke, 167 (Hel.)
Weiss, 378 (Dys.)
Weiss, A., 889 (Z.)
Weiss, E., (285) (Mal.)
Weiss, P., with Battistini, 875 (Z.)
Weiss, S., & Hatcher, (73) (Misc.)
——, with ——, 273 (Mal.)
Weitzman, I., with Kligler, 573, 575 (S.S.), 803 (Dys.)
Weitzman, T., 669 (Bl.)
Welch, S. W., 729 (Mal.)
Welch, T. B., 28 (Dys.)
Wellcome Historical Medical Museum, 684 (B.R.)
Wells, C. R., & Cooper, G. W., 152 (Misc.)
Wendlberger, J., 754 (Mal.)
Wenrich, D. H., & Yanoff, J., 868 (Z.)
Werner, O., & Hartmann, E., 588 (S.S.)
Werngren, E. T., with Dios & Zuccarini, 390 (Z.)
Weselko, O., 261 (Mal.), 654 (Bl.)
West, A. P., with Herrera-Batteke, 217 (Lep.)
Westphal, C., 56 (Misc.)
Wheeler, G. A., with Goldberger, 811 (Pel.)
Wheeler, J. M., 480 (Oph.)
Wheeler, R. E., with Strong, Shattuck & Bequaert, 324 (B.R.)
Whipple, G. H., 660 (Bl.)
White, E. B., & Hadfield, G., 807 (Pel.)
Whitehead, N. T., & Crouch, H. A., 95 (Jaun.)
Wiechmann, E., & Horster, H., 83 (R.F.), 274 (Mal.)
Wilkins, L., 791, 798 (Dys.)
Williams, C. L., 34, 457 (Pl.)
Williamson, C. S., with Kaplan & Geiger, 780 (Am.)
Williamson, K. B., 419 (Z.), 723 (Mal.)
Williamson, K., with Senior-White, 257 (Mal.)
Wilson, F. P., & Shrewsbury, J. F. D., 144 (K.A.)
Wilson, P. W., 725 (Mal.)
Wilson, R. M., 205 (Lep.)
Wiltshire, H. G., 977 (Hel.)
Winckel, C., (313) (Y. & S.)
Wing, R., with Lamson, 235, 674 (Misc.)
Winkler, L., 28 (Dys.)
Winter, O. B., with Huddleson, 620 (Und.)
de Winter, R. P., (73) (Misc.)
Wiseman, W. R., 791 (Dys.)
Witas, P., with Senevet, 520 (Hel.)
Witherspoon, J., (31) (Dys.)
Wittvrouwen, 247 (Misc.)
Wolff, E., 477 (Oph.), 868 (Z.)
Wolff, J. W., 791 (Dys.)
Wolkowa, E. A., with Gloukhoff, Eroussalimtchique & Panine, 372 (Dys.)
Wollenberg, R. A. C., 706 (Jaun.)
Woo, K. M., & Young, M. P., 321 (Myc.)
Wood, D. J., 1011 (Oph.)
Worms, G., Lesbre, P., & Sourdille, G., 366 (Dys.)
Worster-Drought, C., 312 (Y. & S.)
Wright, H. D., with Channon, 591 (S.S.)
Wright, R. E., 472, 1016, 1018 (Oph.)
Wright, W. R., with Walton, 440 (Z.)
Wu Hsiang Feng, 187 (Hel.)
Wu Lien Teh, 456 (Pl.), 502 (B.R.)
——, with Chun, 597 (Bb.)
Würz, P., 752 (Mal.)

Y

Yabe, S., 607 (Bb.)
——, & Endo, N., 607 (Bb.)
Yacob, M., with Lal, 470 (Chl.)
Yakimoff, W. L., 594 (S.S.), 628 (Fev.), 700 (R.F.)
——, Galouzo, J. G., Rastégaïff, E. F., & Loukianoff, W. A., 873 (Z.)
Yamada, S., 422 (Z.)
——, & Komori, K., 994 (Hel.)
Yamaguchi, S., 532 (Hel.)
Yamanaka, S., 748 (Mal.)
Yamazaki, H., & Hosoya, Y., 828 (Misc.)
Yamazaki, S., 173 (Hel.)
Yano, A., (544) (Hel.)
Yano, S., Shimizu, T., Shirai, S., & Kaneko, T., 163 (Hel.)
Yanoff, J., with Wenrich, 868 (Z.)
Yasuda, Y., with Sugimoto, Higuchi, Momoyeda & Tanaka, 598 (Bb.)
——, with —— & Kakegawa, 606 (Bb.)
Yasuhara, S., 466 (Chl.)
Yasuyama, K., (680) (Misc.)
Yoannovitch, G., 548 (Lep.)
Yokochi, K., 365 (Am.)
Yokogawa, S., 198 *bis* (Hel.)
Yorke, W., & Adams, A. R. D., 15 *bis*, 781 (Am.)
Yoshino, M., 276, (759) (Mal.)
——, with Hosomi, (758) (Mal.)
Young, C. W., & Hertig, M., 133 (K.A.)
Young, M. P., with Woo, 321 (Myc.)
Young, T. C. M., 428 (Z.)
——, & Chalam, B. S., 889 (Z.)
Young, W. A., 357 (Am.), 817 (Lab.), 833 (Misc.)
——, & Tudhope, G. R., 13 (Am.)
Yui, C. V., 471 (Chl.)
Yung Tsu, T., 923 (Chl.)

Z

Zabolotny, D., & Oméliansky, W., 455 (Pl.)
Zabolotzkaja, T., with Hoeltzer, 693 (R.F.)
Zahorsky, J., & McLoon, M., 869 (Z.)
Zambrano, J. M., (285) (Mal.)
Zamorano, A., 80 (R.F.)
Zanotti, U., (621) (Und.)
Zanzucchi, A., & Vercellana, G., 39 (Pl.), 112 (Und.
Zdrodowski, P., 108 (Und.)
Zeeman, W. P. C., 482 (Oph.)
Zeiss, H., 695 (R.F.)
Zeitlina, A., with Isabolinsky, 222 (Rab.)
Ziemann, H., 250 (B.R.), 531 (Hel.)
Zizine, P., with Ramond, F., (73) (Misc.)
Zoeller, C., 797 (Dys.)
Zschucke, H., (73) (Misc.)
Zuccarini, J. A., with Dios & Werngren, 390 (Z.)
——, with Mühlens, Dios & Petrocchi, 682 (B.R.)
Zuelzer, M., (903) (Z.)

# INDEX OF SUBJECTS.*

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Compiled by MISS M. H. JAMES.

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**ABORTUS FEVER,** *see* **UNDULANT and ABORTUS FEVER**

**AMOEBIASIS** (AMOEBIC DYSENTERY, LIVER ABSCESS, *&c.*, *see also* **DYSENTERY**), 1–31, 351–81, 775–804

- and Abdominal Granulomatosis, Argentina, **786**
- Amoebae and Entamoebae associated with
  - Cultures of, Action on, of Starch, **19**
    - Differential Characteristics in, of those of Man, **19**
  - Environment as Affecting, **365**
  - Extra-intestinal Infections with; Experimental, **18**
  - of Human Gut, Lambliophagy by, **789**
  - of Man, Differential Characteristics of, in Cultures, **19**
  - of Monkey and Man, Similarities between, **20**
  - Surveys for, Value in, of Cultural Methods, **351**
  - Species referred to by Name
    - *coli*, Experimental Infection with, of a Cat, **21**
    - *Dientamoeba fragilis*, **20**
    - *dispar*, Individuality of, **7**
    - *histolytica*=*dysenteriae*
      - Cultivation of, **363, 364, 365**
        - Influence of Yatren, **365**
        - Medium for, Modification of the Boeck-Drbohlav, **790**
        - Simplified Method of, **18**
      - Cysts of
        - Behaviour of, *in vitro*, **15** *bis*
        - Development and Encystation of, *in vitro*, **781**
        - Infection of Kitten by Rectal Injection of, **20**
      - Infection with, in Carriers, Symptomatology of, **351**
      - Pig, Domestic, a Probable Reservoir Host for, **356**
      - Pyelitis associated with, **10**
      - and *Schistosoma mansoni*, Cystitis caused by, in an Egyptian Boy, **70**
      - Seat of, in the Gut, **353**
      - Small Races of, Pathogenicity of, **780**
      - Trophozoites of, Nuclear Division in, **22**
- Amoebiasis Mask, The, **356**
- AMOEBIC ABSCESS, *see also* LIVER ABSCESS, *infra*
  - Pulmonary, **358, 359, 782**
    - in Mesopotamia, **10**
  - Subphrenic, **359**

**Amoebiasis**—*cont.*

- AMOEBIC CHOLECYSTITIS
  - and Abscess of Spiegel's Lobe, Differential Diagnosis between, **787**
  - Primitive, **11**
- AMOEBIC COLITIS
  - Diagnosis and Treatment, **377**
  - Ulcerative, Emetine Therapy in, **378**
- AMOEBIC DYSENTERY, **4**
  - and Balantidial, in an Arab; Mazagan, **380**
  - Atypical Case, with Pulmonary and Subphrenic Abscesses, and Left-side Empyema, **359**
  - Chronic, **3, 9**
    - and Carriers Treated with Stovarsol, **21**
    - Treatment by Carbo Medicinalis, **378**
  - Complicating Measles Convalescence; Alexandria, **154**
  - Concurrent with Balantidiasis in an Arab, **380**
  - Diagnosis, Differential, Electrical Sigmoidoscope for, **379**
  - Experimental, in Rabbits, **17**
  - Generalized, **8**
  - Human, **6**
    - with Special Reference to the Chronic Phase, **3**
  - Incidence
    - Age
      - Children, **11, 778**
        - Treated by Sorb-Apple, **789**
    - Geographical
      - Argentina, 6, **6**
      - Australia: North Queensland, **779**
      - Belgian Congo: Katanga, 788
      - Brazil, 375
      - Colombia, 11
        - Incidence, **2, 5**
        - Prophylaxis, Survey for, **1**
      - Costa Rica: Mortality percentage, 58
      - Dutch East Indies: Java, 12
      - England, with Liver Abscess, **9**
      - France, 788
      - India: Quetta, 14
      - Italy, 9
        - Bologna, **790**
        - Silicy: Palermo, 778
      - Japan, 13
      - Kano: Prison Outbreak, **976**
      - Katsina, 976
      - Korea: Latent: Results of Yatren Treatment, **353**
      - Morocco, 783
        - Mazagan, **380**
      - Ruanda-Urundi, 55
      - Spain: Madrid, 11

[*] The numbers in heavy type refer to the titles of papers summarized.

**Amoebiasis**—*cont.*
  AMOEBIC DYSENTERY—*cont.*
    Incidence—*cont.*
      Geographical—*cont.*
        Syria, 353
        Tropics, the, **8**
        U.S.A.
          Chicago, in Food-Handlers, **780**
          New Orleans, 12
        Yucatan, 12
      Race, 2
    Interesting Case, and Suggestion for Treatment, **357**
    Intestinal, Complications of, **6**
    Italian Case, 17th Century, resembling, 332
    LATENT, of Koreans: Result of Yatren Treatment, **353**
    with Liver Abscess (*q.v. infra*), contracted in England, **9**
    Ocular Complications as Indications of Unsuspected, **481**
    Pleurisy, Diaphragmatic, in Patients who have had Amoebiasis, **779**
      Right, in Cases from the Tropics, **8**
    Relapse of, 33 Years after Apparent Recovery, **9**
    Thrombosis of Spermatic Veins following, **359**
    Treatment, **362** *bis*, **363**
      Book on, **497**
      Suggestion for, **357**
      Various Methods
        Emetine, 362
          Paresis following Injections of, **22**
          Pathology of Prolonged Administration, **13**
          and Stovarsol, Comparison of, **14**
        Nitsol, **362**
        Rivanol, *per* Rectum, **363**
        Spa, Applications to, of Recent Work, **69**
        Stovarsol, **15**, 362
          in Chronic Cases, and of Amoeba Carriers, **21**
          Comparison of, with Emetine, **14**
        Yatren, **11**, **12** *ter*, **13**, 54, 362, **366**
          Results of, with Koreans, **353**
  AMOEBIC HEPATITIS, **300**
  AMOEBIC INFECTIONS
    of Hip Joint, **786**
    Relapse in, Determination of, **352**
  Atypical, **787**
  Carriers of, Symptomatology of, **351**
  CHRONIC: Pernicious Anaemia in, **785**
  Entero-Pulmonary Fistula of Amoebic Origin, **783**
  GUT, Complications of, **777**
  HEPATIC, Indigenous: France, **784**
  Little-known Manifestations of, **352**
  LIVER ABSCESS
    with Amoebiasis, contracted in England, **9**
    Case of, **777**
    Diagnosis of, **775** *bis*
    Incidence
      Age
        Child of Five: Cure without Operation, **380**
      Geographical
        Cambodia, 783

**Amoebiasis**—*cont.*
  LIVER ABSCESS—*oont.*
    Incidence—*cont.*
      Geographical—*cont.*
        Colombia, West Coast, 57
        England, Indigenous, **9**
        India, **784**
        Korea, **355**
    Opening into Bronchi in Course of Emetine Treatment, **783**
    Rupture of, into Lung, **783**
      Peritonitis after, **22**
    17th Century Knowledge of, 332
    Treatment, **361**, **785**
      Aspiration, with Emetine Injections, and Incision, **21**
  Nondysenteric, Ocular Disease during, **357**
  PULMONARY, **782** *bis*, **783** *quat.*
    China, **10**
    Symptomatology of, in Carriers, **351**
  Titles of Unnoticed Papers, 31, 381, 804

**BERI-BERI**, 125–8, 597–608
  Barley, Vitamin Contents of, **601**
  Book on, **844**
  Cardiac, 127
    Acute, Aspects of, in Adults, **604**
    in Infants, Position in, of Diaphragm as New Feature, **127**
  Circulation and Respiration in, **603**, **605**
  Complement Deviation in, **126**
  Etiology, **126**, **598** *bis*
    Causal Organism, **127**
  Heart in, **602**, **604**
    Radioscopy of, **602**
  Incidence
    Age, **127**, 598, **601**
    Class, **597**, 60, **601**
    Geographical
      Brazil, 125
      China: Yunnan, **601**
      Cochin China, on a Plantation, **126**
      Dutch East Indies, 597, **944**
        Sumatra, 600
      French Indo-China
        Cholon, **603**
        Saigon, 603
      India: Madras, 599–600
      Japan, 597, **598**, 598 *quat.*, 599 *bis*, 601, 606, 607
      Korea, 125
      Philippine Islands, 604
      Sarawak, 599
      Syria: Beyrouth, 601
    Race, **125**, 599, 603
  Infant, *see also* Cardiac, *above*
    Mother's Milk of Infants Suffering from, Vitamine Contents, **606**, **607**
  Kidney, the, and its Functions in, **602**
  Metabolism
    Basal, in, **607**
    in Birds, **599**
    after Ingestion of Rice of Different Degrees of Polishing, **605**
  Observations and Experiments on, **125**
  Oedemas in, **602**
  Polyneuritis of: Cholon, **603**
  POLYNEURITIS AVIUM
    and Kakke, Metabolism in, **599**

**Beri-Beri**—*cont.*
- POLYNEURITIS AVIUM—*cont.*
  - Prophylaxis and Treatment in Pigeons, by Juice of Natsumikan Orange, **607** *bis*
- Prophylaxis, **125**
  - Control of, from an Administrative Standpoint, **597**
    - International, **597**
    - Resolutions on, of the Far Eastern Assoc. of Trop. Med., **599**
- Rice in relation to, 597 *ter*
  - Chemical Changes of, during Preservation, **604**
  - Digestibility and Utilization of, in Different Grades of Polishing and Different Methods of Cooking, **598** *bis*
  - Polishing of
    - Different Grades of
      - and Chemical Composition, Relations between, **605**
      - Respiratory Metabolism after, **605**
      - Vitamin-B Contents of, **604**
    - Extent of, Microbiological Investigation as to, **605**
  - Polished
    - Feeding with
      - Variations of Substances in Organs and Blood of Fowls, **606**
      - Vitamin-B Defect of, in Horses, **606**
  - Resolutions on, of the Far Eastern Assoc. of Trop. Med., **599**
  - Tests of, Methods for, **598**
  - Vitamin-B Content of, **604**
- Symptoms, 598, **601**
  - Skin, Symmetrical, in, **603**
- Titles of Unnoticed Papers, 608
- Treatment
  - in Japan, **598**
  - Various Methods
    - Antiberiberin, **604**
    - Dietetic, **601**
    - Orange (Natsumikan), **607**
- Vitamin, Anti-Beriberi, Isolation of, **126, 607**
- Vitamin Contents of Barley, **601**
- Vitamin B
  - Chemical Studies of: Japan, **604**
  - Contents
    - in Mother's Milk of Infants suffering from Infant Beriberi, **606, 607**
    - of Rice: New, Old, and Various Grades of Polishing, **604**
- Wet, Differential Diagnosis of, from Ascitic Bacillary Peritonitis in Senegalese, **601**

**BLACKWATER FEVER,** 650–69
- Bilious Haemoglobinuric Fever, **669**
- Blackwater Fever, **659**
- Case of, **668**
- Cold in, Action of, Evident, **662**
- Due to Spirochaetes, Clinical Considerations on, **659**
- Genesis of, Investigation on, **658**
- Haemoglobinuria
  - Accompanied by Raynaud's Syndrome, **666**
  - Clinical Researches on, **654**

**Blackwater Fever**—*cont.*
- Haemoglobinuria—*cont.*
  - in Malaria, Pathogenesis of, **669**
  - Treatment of, **666**
- Haemoglobinurias, The, **655**
- Icterus without Haemoglobinuria, after Quinine Treatment, **662**
- Incidence
  - China, 281
  - Congo
    - Belgian, 666
    - French: Brazzaville, 659
  - Dakar, 662
  - Dalmatia: Skradin, **654**
  - England, **650**
    - London: Critical Study, **650**
  - Formosa, 658
  - French West Africa: Gabon, 667
  - Greece, **669**
  - India, 668
  - Kenya: Broderick Falls, **669**
  - Palestine, in a Bedouin, **669**
  - Panama, 660
  - Scotland, **669**
  - Uganda: Report on, for 1925, **653**
- Obstruction of Renal Tubules during Excretion of Haemoglobin, **664**
- Pathogenesis of, **657**
  - Combined Action in, of Lipoid Substances and Quinine, **665**
- Pathology of, **660**
- Problem of, Demonstrations and Explanations on, **669**
- Treatment of, **667**
  - Various Methods
    - Alkaline Infusion, Intravenous, **667**
    - Antivenomous Serum, **667**
    - [Calcium and Peptone], **654**
    - Kidney Decapsulisation, **668**

**Cerebro-Spinal Meningitis,**
- Incidence
  - Germany: Coblenz Epidemic, 157
  - Trinidad, **67**

**CHOLERA,** 41–7, 460–71, 923–8
- Bacteriology
  - Spirilla, Soil, and Cholera Epidemiology, **926**
  - *Vibrio cholerae*
    - Agglutinating and Non-Agglutinating, found in the Human Intestine and in Water: Relationship between, **460**
    - Bacteriophage, and Haemolytic Endotoxin of, **469**
      - Importance of, **470**
      - Preparation of, **470**
    - and Cholera-like Vibrios
      - Agglutination, Non-Specific, of, **47**
      - Coagulation and Decomposition by, of Egg-Yolk, **926**
      - Fermentative and Morphological Characters of, **43**
      - Variations in, **44**
    - Classification of according to Bacteriophage characters, **470**

**Cholera**—*cont.*
- Bacteriology—*cont.*
  - *Vibrio cholerae*—*cont.*
    - Cultivation of
      - Anaerobic, **45**
      - Media for
        - Haemoglobin-Soda-Agar Medium, a New " Kamanuki " Specific Medium, **471**
        - Relative Suitability of Certain Foodstuffs as, **470**
        - Simple, Growth and Metabolic Products of, in, **45**
    - Nitrite Production by, **928**
    - Receptor Structure of, **44**
    - Septicaemic and Enterotropic Characters of, **466**
    - Specific Substance of, Investigation for, **467**
    - Strains in Japanese Epidemic, 1925, Types and Classification, **465, 466**
    - Survival of, in Water, in Winter, **466**
    - Types of, Current, **471**
    - Vitality of, in Fish and Water, **404**
    - Vibrios Resembling, Biological Characters of, **926**
      - Fish Epidemic due to, **927**
  - *Vibrio kadikjo*
    - Infection Experiments with, **46**
    - Precipitinogen and Haemotoxin of, Relationship of, **467**
  - *Vibrio phosphorescens*, Relation of, to *V. cholerae* and other Vibrios, **469**
- Cholera Bacteriophage, Importance of, for the Vibrio, **470**
  - Preparation of, **470**
- Cholera-red Reaction, the, **471**
- Cholera Sicca, **461**
- Diagnosis
  - from Cellular Exudate, **928**
  - Clinical, **471**
  - Differential, **458**
- Differentiation from, of Paracholera, **468**
- Epidemics : Forecasting of, **923**
- Epidemiology of (*see also* Incidence, *infra*), Soil Spirilla and, **926**
  - and Endemiology of, A New Conception of, **460**
- Etiology: Pettenkofer's Theory of, **342**
- Incidence
  - China
    - Hoihow 1926 Epidemic, **461**
    - Shanghai, **462,** 923
  - India
    - Anti-Cholera Vaccination in, **923**
    - Conditions Influencing Incidence and Spread, **41**
    - [Curves of], 923
    - Studies in, **923**
    - Bengal
      - in Ballast Coolies, **42**
      - as Chief Nidus of, 52
    - Bengal and Bihar and Orissa, in Coal-fields, 924
  - Japan, Studies of, **463**
  - Philippine Islands, San Lazaro Hospital Cases ; Sept. 1 to Nov. 30, 1925, **462**

**Cholera**—*cont.*
- Infection, Apparently by Crabs, Shanghai, **923**
- Laboratory Case, **924**
- Paracholera, Differentiation of, from, **468**
- Peritonitis of, Prevention of, by Blood Platelets of Immunized Rabbits, **46**
- Portuguese Observation of, 16th Century, **330**
- Prophylaxis
  - Anti-Cholera Vaccination, in India, **923**
  - Essential Oils in, **47**
- Titles of Unnoticed Papers, 47, 928
- Toxin of, Procural and Testing of, **471**
- Treatment, **43**
  - New Era in, **924**
  - Practical Hints on, **471**
  - Routine, in Shanghai, **462**
  - Various Methods
    - Essential Oils, **47, 462** *bis*, **924**
      - Mistura Pro-Diarrhoea, and Permang. Pot., **462**
    - Hypertonic Saline Solutions, Rationale of, and Note on Criticisms of, **924** *bis*

**CLIMATIC BUBO,** 316–17
- Climatic Bubo, **317**
- Lymphogranuloma of Groin, **316**
- Poradenitis or Subacute Lymphogranulomatosis, **316**
- Treatment by Protein Shock, 53

**DENGUE, PAPPATACI, AND UNCLASSED FEVERS,** 119–20, 626–8
- DENGUE
  - Epidemic Resembling, at Cape Cod, **119**
  - Incidence
    - Aden, **626**
    - Australia: Queensland, 627
    - Dakar
      - in Naval Forces, **627**
      - Relapsing Fever concurrent with, **688**
    - India
      - Lucknow, so-called Seven-Day, 119
    - Sudan, **627**
    - U.S.A. : Jacksonville, 626
    - West Africa, **119**
  - Keratitis as Complication of, **626**
  - Mortality, **627**
- UNCLASSED FEVERS
  - Epidemic at Cheribon, Java, 1805, **344**
  - Five-Day Fever : Petrograd, **628**
  - Mosquito-Fever of the Crimea, Blood Picture in, **120**
  - Seven Day Fever : Saigon, on War Ships, **628**
  - Three Day Fever : Syria, **627**

**DERMATOLOGY, TROPICAL** (*see also* **MYCOLOGY**)**,** 441–52
- DISEASES
  - Actinomycosis, White Grain : Belgian Congo, **446**
  - Blastomycosis of Forearm in Native Woman ; Algiers, **446**

**Dermatology, Tropical**—*cont.*
  DISEASES—*cont.*
    Creeping Disease
      Histology of, **449**
      Incidence
        East Africa, of 20 years' Duration, **450**
        Manitoba, First Case, **449**
        Russia : Moscow, **450**
    Dermatitis
      of Durhing, **451**
      herpetiformis, Treatment by Malarial Inoculation, **452**
      Keloid Blastomycotic : Saigon, **447**
    Dermatomycoses
      Hotsy-potsy : Comoros and Madagascar, 56
    Mazamorra, of Boot-wearers : West Coast of Colombia, 57
    Mossy Foot : Italian Somaliland, **450**
    Mycetoma
        Classification of, 443–4, *diagram*, 445
        of Tripolitania, **443**
      pedis
        Incidence
          Algeria, **445**
          Tunis, **445**
    Pemphigus
      Brazilian variety, 451
      Tropical, **451**
    Piedra : Colombia : Causal Fungus, 442
    Prickly Heat : Etiology and Pathology, **447**
    Prurigo, due to Oxyuris, **452**
    Purú-Purú : Brazil, **443**
    Ringworms, Tropical **441**
    Sores : Ruanda-Urundi, 55
    Trichonocardiasis : Armenia, **443**
    Ulcers : Phagedenic : Ruanda-Urundi, 55
    Ulcus-tropicum = Leishmaniasis, 56, 58
      Treatment, **448**
        Local, **448**
        New, **448**
    Xeroderma pigmentosum : Tunis, **451**
  PARASITES AND FUNGI ASSOCIATED WITH
    FUNGI
      Pathogenic, of the Type of *Trichosporum beigeli*, **442**
    PARASITES
      Itch Mite, Transmission of, Experimental, to the Baboon, **450**
  Titles of Unnoticed Papers, 452

**DYSENTERY,** BACILLARY, CILIATE, FLAGELLATE, MIXED AND UNCLASSED (*see also* **AMOEBIASIS**), 22–31, 366–81, 791–804
  BACILLARY, 22–8, 366–79, 791–803
    Antitoxic and Antibacterial Dysentery Serum, Therapeutic Value of, and Therapeutic Unit of Antitoxic Serum, **369**
    Bacteriology, **24**
      Bacillus(i) associated with
        *dysenteriae*
            Biology of, with Special Reference to the Catalase Reaction, **371**

**Dysentery**—*cont.*
  BACILLARY—*cont.*
    Bacteriology—*cont.*
      Bacillus(i)—*cont.*
        *dysenteriaecont.*
          in Blood, Demonstration of, **366**
          Carriers of, Healthy, **23**
          Cultivation of, in Bile, **367**
          Rôle of, in Arthritis Deformans (Type I), **26**
          Serological Grouping of, based on Quality of Antigen and Normal Agglutinins, **24**
          in Stools, Enrichment Process for, **368**
            Nissl's Method, Value of, **795**
          and Variants in Japan, Classification of, **370**
          Vaccination, Oral, with, in Rabbits, Agglutination Reactions following, **797**
        Flexner, Infection with, Unusual in Symptoms, **22**
          So-called, Types, Mutation of, **370**
          Vaccine of, Oral Administration of, Unsuccessful, **798**
        Komagome in Japan, 370
          Pathogenicity of, **371**
        Shiga
          Fermentation of, **795**
          Four Strains of, Difference in Pathogenicity, Toxicity and Immunizing Power, **801**
          Living, Intramuscular Vaccination with, **802**
        Shiga Type
          Cocto-Immunogen of, **796**
          Degenerated Form of, caused by Bacteriophage, **794**
        Shiga-Kruse
          Bacterial Lysate of Immunization by, **27, 372**
          Toxin Formation by, Variation of, with Hydrogen-Ion Concentration, **25**
        Sonne
          Identification of, in England, **24**
          Infection with, in Great Britain, **367** *ter*
        *metacoli* : Biology of, 795
        Ohhara's, in Ekiri, **802**
        Pseudodysentery, Milk-Coagulating, **368**
        Typho-Dysentery Organisms, Culture Medium for, **26**
        Unnamed, from Case of, **373**
    Diagnosis of, **792**
    Dysentery Skin Reaction, Positive, Relative Frequency of, at Different Ages, **26**
    E. Type, Berlin-Epidemic (1926), **792** *bis*
    Epidemiology of, **792**
    Flexner Type, Treatment by Bacteriophage in, **794**
      Acute, Serum Treatment of, **793**
    Incidence : All Forms
      Age, Infants, **791, 798**
        Oral Vaccination of, with Flexner Vaccine, Unsuccessful, **798**

**Dysentery**—*cont.*
  BACILLARY—*cont.*
    Incidence—*cont.*
      Geographical
        Dutch East Indies
          Sumatra, Deli; Epidemiology, **791**
        East Africa: Kenya, **798**
        Egypt, 25
        Great Britain, **367** *ter*
          England: Sporadic, **802, 803**
          Scotland, near Glasgow: Bacteriology of, **791**
        Germany: Berlin, **792** *bis*
        India, 52
          Nagpur, **23**
        Japan, **370,** 371
        Malay States, 794
        Poland: Warsaw, 26
        U.S.A., Baltimore, 791
      Race
        White Infants under 2 years old, **791**
    Intradermal Reaction in, **26**
    Investigations on, Review of, **369**
    Nomenclature, **792**
    Oculo-Articular Symptoms, Late in, Specificity of, **366**
    Prophylaxis
      Antidysenteric Immunity, a Form of Antitoxic Immunity, **797**
      Immunization by Bacterial Lysate of Shiga-Kruse Bacilli, Obtained by Bacteriophagic Action, **27, 372**
      Vaccination
        in Infants and Children, **801**
        Intramuscular, with Shiga Bacilli, Living, **802**
        Oral, **797, 798** *ter*, **801**
          and Parenteral, **800** *bis*
        Vaccine for, of Flexner Bacilli, Unsuccessful, **798**
          Preparation of, **798**
        Vaccines, Polyvalent: E. Africa, **798**
    "Sonne" Variety in Great Britain, **367** *ter*
    Toxin of
      Constitution of, and Relation of, to Testing of Antidysentery Serum, **796**
      Formation of, by Shiga-Kruse Bacilli with [Varying] Hydrogen-Ion Concentration, **25**
      Physiological Action of, **25**
    Treatment of, All Forms
      Bacteriophage, **794** *bis*
      Castor Oil *versus* Saline Aperient, **28**
      Cresol, **373**
      Serum, **793**
      Vaccine, by Mouth, **372**
      Yatren, 54
  CILIATE = Balantidiasis
    Concurrent with Amoebic Dysentery in Arab; Mazagan, **380**
    Incidence
      Dutch East Indies, in Amboinese Soldier, **380**
      Spain, **31**
      Sweden: Stockholm, 30, 31

**Dysentery**—*cont.*
  CILIATE—*cont.*
      Syria, in Algerian Soldier, **804**
    Treatment, **30**
      Various Methods
        Santonin, **804**
        Stovarsol, **30**
        Thymol and Stovarsol: Cure, **380**
  FLAGELLATE
    GIARDIASIS = LAMBLIASIS
      Incidence
        Age: Infant, 379
        Geographical: Ruanda-Urundi, 55
      Parasites associated with
        *Giardia* = *Lamblia intestinalis*
            and Cholecystitis, **28**
            Infection by, in [Hindu] Infant, **29**
              Prevalence and Pathogenicity of, in Argentina, **28**
      Treatment by
        Hyd. c. Cret., **379**
        Stovarsol, **29,** 29
  MIXED AND UNCLASSED, 28–31, 373–81, 803–4
    Alvine Fluxes, Woodward's Monograph on, **333**
    Bacteriology
      *Vibriothrix zeylanica*: Morphology, Culture, and Reactions, **488**
    Chronic, **376**
      Treatment by Carbo Medicinalis, **378**
        Diagnosis of, **377**
    Colitis
        Discussion on, **377**
        Treatment of, **377**
      Ulcerative, Treatment by Emetine, **378**
    Diagnosis
      Differential, 488
      Laboratory, **373**
    Ekiri
      Causal Agent, **802**
      in Japanese Children, **374**
    Enterorrhagia, Intractable, Cured by Single Injection of Novarseno-benzol, **379**
    Gastro-Enteritis in Alipuram Jail, Bellary, **375**
    History of, in the 18th Century, **333**
    Incidence
      Brazil, **375**
      Colombia, West Coast, 37
      India: Madras: Bellary, **375**
      Nicaragua:
        Matagalpa, in Children, **803**
      Palestine, **803**
      South Africa, 373 *quat*
    Medical Side of, **373**
    Notes on, in the XVI and XVII Centuries, **331**
    Paediatric Aspect of, **373**
    Pathology of, **373**
    Sigmoidoscope, Electrical, in, **379**
    Surgical Aspect of, **373**
    Tropical in Children
      Treatment by Yatren, **803**
  Title of Unnoticed Paper, 381

**ENTERIC FEVERS IN THE TROPICS**, 48–51
Bacteriology
*Bacillus typhosus*
Old Broth Cultures of, Soluble Protein in, Variation in Amount of, **51**
*paratyphosus*, *dysenteriae*, *cholerae*, and *coli*, Differential Diagnosis of, **488**
Persistence of, in Rabbits, after Intravenous Injection, **51**
PARATYPHOID
Céara District, 57
B., in Nicaraguan Woman, **48**, *chart*, 49
Other forms than A and B, 57
Titles of Unnoticed Papers, 51
TYPHOID
Clinical Resemblance of, to Kala Azar, 155
Etiology: Pettenkofer's Theory of, **342**
Fevers Resembling, Diagnosis of; India, **155**
Incidence
Geographical
Costa Rica: Decrease in, **57**
Nicaragua, 48, 49
Race; African Natives, Manifestations Peculiar to, **48**
Inverse Type of, **48**
Prophylaxis
Antityphoid Vaccination by the Mouth, **50**
Surgical Complications of, **49**
Symposium on, **48**
Treatment by Coleman Diet, **50**

**Gangosa** *see under* **YAWS AND SYPHILIS**

**Goundou**
in Nigeria, in a Boy, **305**
Relation of, to Yaws, **305**

**GRANULOMA VENEREUM**, 313–16
Etiology, **314**
Granuloma Tropicum [Australia], **315**
Incidence
U.S.A., New York, **313**
Treatment by
Antimony and Pot. Tartrate, Intravenous, **316**
Thioglycollates of Antimony, **315**
Ulcers of, *see* Ulcers, *under* **MISCELLANEOUS**

**HELMINTHIASIS**, 161–204, 507–44, 975–1010
Anthelmintic Medication
Developments in, **164**
Some Practical Principles of, **165**
Anthelmintics and Vermicidal Drugs, etc.,
Action of, Testing of, New Method for, with Mercurochrome, **166**
Action of Camphor, Hexatone, and Sod. Salicylate, **168**
Activity of, Influence on, of Bile and Pancreatic Juice, **511**
Carbon Tetrachloride, Efficacy of, **204**
Glycerin: Failure of, **979**
Halogen Compounds of Methane, Ethane, and Ethylene, Lethal Properties of, **167**
Macunin, Efficacy of, **204**

**Helminthiasis**—*cont.*
Anthelmintics and Vermicidal Drugs—*cont.*
*Quisqualis indica*, Alleged Anthelmintic Property of: Case Reports, **511**
Santonin: Overrated, **979**
Vermifuges, Intravenously, **979**
DISEASES, and Parasites connected with them, *see also* PARASITES, *infra*
Helminthic Infections of Lungs, and Verminous Bronchitis, **164**
in Labourers, Ceará, **57**
Parasitic Infection among Cairo Police. Effect on, of Period of Service, **161**
Prevalent in
Costa Rica, 58
Korea, **162**
Abscess, Verminous, **188**
ANKYLOSTOMIASIS
Carrier and Patient, Distinction between, **536**
Detection and Treatment of; Dongola Prov., A.-E. Sudan, **508**
Diagnosis
Mass: Criticisms, **542**
Place in, of the Smear, **195**
Incidence
Geographical
Adjaristar, **978**
Angola, 507
Argentina: Corrientes, **537**
Australia, **543**
Brazil, **542**
Caucasus, W., in Scholars, **540**
Ceylon, 201
China, 507
Results of Work of China Hookworm Commission, **193**
Costa Rica, 58
Dutch East Indies, 541 *bis*
Sumatra: Billiton, **541**
Georgia, **543**
Endemic Foci of, **509**
Formosa, **1005**
in Japanese Immigrants, **1005**
French Equatorial Africa: Ouadai, **1004**
India
Assam, **191**, **1009**
Bengal, **190**, **191**
Bihar and Orissa, 192, **538**
Burma, **538**
Central, and Bombay, **1003**
North-west, **1003**
United Provinces, **538**
Italy: Forli Province, **543**
Mexico, **195**
Papua, 201
Paraguay, in Natives: Pure *A. duodenale* Infestation and its Ethnological Significance, **537**
Philippine Islands, **194**, **195**
Porto Rico
Amount and Distribution of, **1004**
Reinfestation after Treatment, **200**

**Helminthiasis**—*cont.*
 DISEASES—*cont.*
  ANKYLOSTOMIASIS—*cont.*
   Incidence—*cont.*
    Geographical—*cont.*
     Portugal, Indigenous, and Imported in Mines, **543**
     Réunion, **1005**
     Ruanda-Urundi, 55
     Siam : Petchaburi, 59
     Somalia, 507
     Straits Settlements
      General Survey, **192**
      Survey of, Final Report on, **544**
     Transcaucasus, Endemic Foci of, **202, 543**
     Tunis, Foci of, **203** *bis*
      Southern, **543**
     U.S.A.: Tennessee, **539**
     Witwatersrand Gold Mines, **1004** *bis*
    Occupational, **191**
    Race, **195**
   Ocular Complications and Diseases in, **481** *bis*
   Optic Neuritis, presumably due to, **544**
   PARASITES
    Ancylostoma
      Counts and Classification of, in Hospital Patients, **203**
      Oral Infection with, **198** *bis*
       Especially with Young Larvae, **1005**
       with Special Reference to Migration of Larvae in Host's Body, **1006**
      Eggs
       Culture Method for, New, **197**
       of Expelled Worms, Effect on, of Carbon Tetrachloride, Ol. Chenop., and Thymol, **1009**
       in Faeces, Estimation of, by Various Methods, **195, 196** *bis*, **197** *bis*
       Hamburg Coverglass Count for, **1008**
       Number of, per Gram of Stool and Number of Female Worms, Relation between, **1006**
       Passed, and Number of Infesting Worms, Numerical Relation between, **1001**
      Larvae
       Attitudes of, **203**
       Behaviour of, in Host's Body, **993**
       Charcoal Cultures for, **1007**
       in Infection *per* Os, Behaviour of, **540**
       Passage of, from Pulmonary Blood to Viscera, **198**
       Temperatures Fatal to, **203**
      Prevalence in relation to Soil: Tennessee, **539**
     and *Necator*, at Goa, **509**
      Larvae of, Morphological Differences between, **540**
      Statistical Differentiation of, **537**

**Helminthiasis**—*cont.*
 DISEASES—*cont.*
  ANKYLOSTOMIASIS—*cont.*
   PARASITES—*cont.*
    Ancylostoma—*cont.*
     ***caninum*** and ***Necator americanus***
      Larvae of
       Differentiation of, **199**
        Microscopical, **1010**
      Oral Infection with, 198
     ***duodenale***
      and Achlorhydria, Subacute Combined Degeneration of the Cord Associated with, **200**
      Infestation, Pure, in S. American Natives : Ethnological Significance, **537**
      and *Necator americanus*
       Larvae of
        Activity and Resistance of, Differences in, **1007** *bis*
      Relative Egg-output of, **1006**
      Oral Infection with, **198**
      Third Larval Stage of, **1009**
       Difference of, from that of *Necator americanus*, **1010**
     *Necator americanus* and *Ascaris*, Eggs of ; Disinfecting Agents for Human Excreta Containing, **200**
     in School-children, W Caucasus, **540**
     Ova and Larvae of, Development of, Effect on, of Sea-Water, **1008**
   Inquiries on, Controls in, Need and Use of, **1007**
   Ocular Complications in, **481**
   Prevalence, Epidemiology and Prophylaxis in India, **190, 191**
   Prophylaxis, **203**
    Hookworm Campaigns
     Brazil, **542**
     British Guiana, **538**
    Latrine-provision, 191, 192
   Symptoms, **199**
   Thyroid Function in, **1010**
   Treatment, **202**
    Carbon Tetrachloride
     Idiosyncrasy for, **673**
     Poisoning with, **541**
     Pure, in Capsules (Necatorina), 542
     as Vermifuge, **541**
     With Croton Oil, **201**
     With Ol. Chenop., **537**
      Critical Tests of, **543**
    Glycerin : Failure, **979**
    Mass, for Tea Estates, Assam, **1009**
    Necatorina, 542
    Ol. Chenop, 201, **201, 202**
     and Carbon Tetrachloride Combined, **541**
    Tetrachlorethylene, **201**
     Value shown by Egg-counts, **1009**
    Thymol, 201, **201**
  ASCARIASIS
   Ascaris or Ascarids of
     Abscess due to, **188**

- **Helminthiasis**—*cont.*
  - DISEASES—*cont.*
    - ASCARIASIS—*cont.*
      - Ascaris or Ascarids of—*cont.*
        - Action on, of
          - Camphor Derivatives, **1001**
          - Ol. Chenop., **1001**
          - Santonin, **1001** *bis*
        - Infection with, Track of, **187**
        - in Intestinal Perforation: Significance of, **1000**
        - Ova, Counting of, Formula for, to Estimate Number of Adult Worms, **1001**
          - Division of, **997**
          - in Growth, Specific Gravity of, Oscillation in, **1001**
          - Passed, Numerical Relation between and Number of Infesting Worms, **1001**
        - Placental Infection of, **1000**
        - Prevention and Extermination of, **188**
        - Pseudo-Peritonitis Chronic, due to, **534**
        - Résumé of Recently Published Works on, from the Parasitologic Laboratory, Keio University, **997**
        - Studies on, **187**
        - Toxic Principle of, **188**
      - *lumbricoides*
        - Action on, of
          - *Allium sativum*, **533**
          - Cresols, **533**
        - and *A. suilla*, Are they Identical? **533**
        - in Bladder, **535**
        - Development of, in Laboratory Animals, **533**
        - in Fallopian Tube, **534**
        - Infection with, Some Unusual Manifestations of, **1000**
        - Larvae of
          - Behaviour of, in Host's Body, **993**
          - Brain and Kidney Changes due to, **532**
        - Obstruction, Intestinal, Acute, due to, **188**
        - Surgical Aspects of [Korea], **999**
      - *Belascaris*, Prenatal Infestation of, Development in, **999**
      - *Lagocheilascaris minor* Infestation: Trinidad, **999**
    - Cholera Simulated by, **534, 1000**
    - Diagnosis, Radiological, **533**
    - Experimental, of Young Pigs, with Special Reference to A.-Avitaminosis, **998**
    - Human, as a Household Infection, **998**
    - Incidence
      - Age
        - Sucklings, and its Influence on their Nourishment, **534**
      - Class: Troops, **515, 998**
      - Geographical
        - Brazil, with Pulmonary Lesions, 533
        - Siam: Petchaburi, 59
        - Singapore: in Garrison, **998**

- **Helminthiasis**—*cont*
  - DISEASES—*cont.*
    - ASCARIASIS—*cont.*
      - Meningitis, Ascaridial and Tuberculous, and, **534** *bis*
      - Pulmonary Lesions in, 533
      - Treatment
        - Ol. Chenop.: Cure in Adults, **533**
        - Santonin, **188**
      - Typho-Lumbricosis, in Child, India, **1000**
    - BILHARZIASIS or SCHISTOSOMIASIS
      - Carcinoma of the Colon associated with, in Young Woman, **519**
      - Cure of, Estimation of, **517**
      - Diagnosis, Aid to, of Injections, Intravenous, of Protein-Free Alcohol-Soluble Cercarial Extracts producing Specific Antibody, **518**
      - Incidence, Geographical
        - Africa, North, **515**
        - Algeria: Djanet, **514,** 515
        - Cirenaica: First Case, **987**
        - Cochin China, in Soldiers from the West Indies, **515**
        - Dongola Province, A.-E. Sudan, Endemic, **508**
        - Egypt, **161, 174**
          - Kom Ombo, Agricultural Schemes in Nile Valley as Bearing on, **174**
        - French West Africa, **514**
        - Japan, **513**
          - Pathology of, and Prophylaxis, **519**
        - India: Bengal, **174**
        - Morocco, 163, 515
          - Absent at Tangier, **163, 986**
        - Portugal, **986**
        - Ruanda-Urundi, 55
        - Sahara; Djanet, **514**
        - Sierra Leone: Prophylaxis: Report on Kaiyima Scheme, **514**
        - South Africa, 516
          - Problem of, **174**
        - Tunis, 515
        - Zanzibar, Snail Host for, **987**
      - in Monkeys, Cure of, Early Spontaneous: Bearing of, on Species Immunity, **517**
      - Pathology of, Japanese Investigations on, Historical Review of, **519**
      - Prophylaxis, **519**
      - Schistosoma associated with
        - Cercariae of, Furcocercous, Studies on, **987**
        - Complement Fixation with, **176, 518**
        - Mollusc Hosts of, in Africa, 514 *ter*, 515 *ter*, **987**
          - Effect on, of Dessication, **986**
        - Ova
          - Measurement of, **178**
          - in Ruptured Spleen, with Haemorrhage, **515**
        - Seventeen Species of, Differentiation and Distribution of, **178**

**Helminthiasis**—*cont.*
DISEASES—*cont.*
BILHARZIASIS—*cont.*
Schistosoma associated with—*cont.*
*haematobium*
Attempts to Infest *Bullinus brocchii* with, **515**
Chemotherapy and Immunity Reactions of, **176**
Miracidium of: Histology: Anatomy, **177**
*incognitum*, n. sp., Bengal, **174**
*japonicum*
Infection with
Treatment by
Mercurochrome and Tartar Emetic, **177**
Stibnal, and Neostibnal, **520**
Life History, **520**
Tumour of Spleen, Acute, in, **177**
*mansoni* and *A. histolytica*, Cystitis due to, in an Egyptian Boy, **70**
Development of, **986**
Egg-laying of, Cosmic Forces Influencing, **519**
Infection with, Pathological Changes in, **518**
*spindalis*
Cercarial Antigen in Serological Diagnosis of, **175**
Chemotherapy and Immunity, Reactions of, **176**
Diagnosis of, Serological, **175**
in Monkeys and the question of Immunity, **517**
Pathology of, **175**
South African: Structure and Life History of, **987**
Transmission of, Experimental, to Indian Water Buffalo, **518**
Some Cases, **516**
Splenomegaly
Egyptian in Relation to, **174**
in Parisian Case, from Martinique, **986**
Treatment
Methods used, Comparative Study of, **516**
Various
Antimosan, **517**
Bayer S.B. 212, New Remedy, **516**
Tartar Emetic, **177, 508, 980**
Question of Efficacy of, **517**
VESICAL, **178**
Cure by Antimosan, 517
Incidence, Geographical
Somalia, **515**
West Africa, in Children, **178**
French, **514**
Ova, Spindle-shaped in Urine in, **516**
Urine Examination in, **516**
Treatment by Emetine Periodide, **178**
BOTHRIOCEPHALIASIS: Palestine, **526**
CLONORCHIASIS
*Clonorchis sinensis* of, 172
Cercaria of Biological Studies on, **172**
in China, **170**

**Helminthiasis**—*cont.*
DISEASES—*cont.*
CLONORCHIASIS—*cont.*
*Clonorchis sinensis* of—*cont.*
Distribution of, in Ukishma Village, &c., Japan, **513**
Experimental Infection with, and Distribution of, in Liver, **172**
Life-History: Egg-Miracidium Stage of, **171**
in Liver of Rabbit Experimentally Infected, **172**
Mollusc Hosts of, **168, 507, 983, 985**
Problems of, **171**
Therapeusis, Specific, in, **172**
DISTOMIASIS
*Fasciola hepatica* of: Gut of, Development of, **981**
Intermediate Host of: Japan, **168**
Hepatic, due to *Fasciola hepatica* and *Dicrocelium lanceatum* in Children: Turkestan, **512**
Experimental, Treatment by Neostibnal, **984**
Incidence
China, **170, 985**
Is it a Menace to Health? **984**
Japan, **513**
Korea, 162, **169**
Russia, Asiatic, **980** *ter*
Nakhichevan, **514**
Tripolitania, **513**
Turkestan, **512**
Prophylaxis
Avoidance of Raw Meat, **984**
Rarity, **981**
Symptomatology, **173**
Treatment, **173**
Emetine, **980** *ter*
Male Fern, **513**
Specific, **172**
*CYSTICERCUS CELLULOSAE* Infection
Deviation of Complement in, **523**
Diagnosis of: Lab. Methods, **523** *bis*
in Brain, **182**
in the Philippines, **988**
DIARRHOEA, in Monkeys Infested by *Oesophagostomum*, *Strongyloides*, and *Trichomonas*, **994**
DRACONTIASIS, *see* GUINEA-WORM INFESTATION, *infra*
ECHINOCOCCOSIS = HYDATID DISEASE
in Animals, New Zealand, 520
Biological Conceptions of, Some Modern, **521**
Diagnosis
Biological Methods of, Comparison of, **522**
by Intradermal Reaction, **522,** 523
for Location of Obscure Cysts, **522,** 523
Value of, **522**
Laboratory Aids in, **521**
Serological, **521, 523**
X-Ray, **182**
*Echinococcus* of
Adult, Experimental Infection with, of Cat and Fox, **988**

- **Helminthiasis**—*cont.*
  - DISEASES—*cont.*
    - ECHINOCOCCOSIS—*cont.*
      - *Echinococcus* of—*cont.*
          - Culture *in vitro* of Scolex and, **524**
          - Extract of, and Extract of *Ascaris*, Skin Reactions to, **988**
            - Obtainment of Positive Serum for Control in Hydatid Test, **989**
          - Life-history of, **521**
          - Poison of, Nature of, **523**
        - *multilocularis* in Domestic Herbivora, and its Relationship with *E. alveolaris*, **180**
      - Hepatic, **524**
      - Hydatid Cyst(s)
        - Enzymes of, **181**
        - Membrane of, Changes in, **184**
        - Permeability of, **182**
      - Hydatid Fluid, Injection of, Specific Antibodies Produced by, **181**
      - Hydatid Toxin, Nature of, **182** *bis*
      - in Man
        - Incidence
          - Algeria, **520**
          - Australia, 180
          - China, **989**
          - Japan, 521
          - Morocco, 520
          - New Zealand, 520
          - South Africa; Karroo, **988**
          - Tunis, 520
      - Radiotherapy and, **524**
      - Serological Studies on, **521**
      - in relation to Sheep, 988
      - Surgical, Symptoms of, **181**
    - ENTOZOAL INFECTIONS
      - Diagnosis of, Exam. of Faecal Specimens in, Value of Three, **511**
    - *FASCIOLA HEPATICA* Infection, *see* DISTOMIASIS *supra*
    - *FASCIOLOPIS BUSKI* Infection
      - Egg-Worm Correlations in, **981**
      - Incidence
        - China, **168, 981,** 982
        - U.S.S.R., First Case, **982**
      - Life Cycle of the Parasite, **168**
      - Treatment, **982**
    - FILARIASIS
      - ELEPHANTIASIS, FILARIAL
        - Incidence
          - China, 529–30
          - Venezuela, 187
      - Filaria and Microfilaria associated with
        - *bancrofti*
          - Endemic area of: China, **529**
          - Larvae of, Experiments with, 186
            - Whence Escaping from Mosquito's Proboscis, **994**
          - Movement of, **187**
          - in a Teratoid Tumour, **531**
        - *Dirofilaria* genus and *Loa* genus, Morphological Study of, **531**
        - *immitis*, Treatment by Natrium Antimonyl Tartrate, **995**
        - *medinensis* (Guinea-worm, *q.v.*), in Koreans, **996**
        - *perstans*, Development of, in *Culicoides grahami*, **995**

- **Helminthiasis**—*cont.*
  - DISEASES—*cont.*
    - FILARIASIS—*cont.*
      - Filarial Fever, Treatment by Neosalvarsan, **994**
      - Filarial Infection: Fatal Case, **995**
      - Incidence
        - in Crows, 186
        - Geographical
          - Australia, **543**
          - China: Kiang-Su Province, **529**
          - Comoro Islands, 56
          - Dutch East Indies, in Different Population Groups, **530**
          - India: Bihar and Orissa, **531**
          - Philippine Islands: Report on Survey, **187**
          - St. Croix, Virgin Islands, **530**
          - Venezuela, **187**
      - Pathological Changes in, 186
      - Problem of, Plea for Thorough Investigation of, **994**
      - Rare at Tangier, **163**
      - Studies in, **186**
    - Forms present in
      - China, 507
      - India, **538**
    - GUINEA-WORM INFECTION = DRACONTIASIS or DRACUNCULOSIS
      - Guinea-worm of, Extraction of, 16th Century Portuguese on, 330
      - Identified with a Disease of the Cruciform Script, **348**
      - Incidence
        - Algeria, in Senegalese Soldiers, **996**
        - Congo region, **330**
        - Korea, **996**
      - Personal Experience, **996**
      - Treatment
        - Tartar Emetic: Successful, 980
        - Tournier's Method, **996**
    - LIVER-FLUKE INFESTATION: Japan, **168**
    - LOAISIS
      - Case of 17 Years' Duration, **531**
      - in Central Africa, **995**
    - ONCHOCERCIASIS, **995**
        - Africa, **531**
        - America, Central, Locale of, on Body, 531
      - *Onchocerca* of
      - *caecutiens*, **532**
      - *volvulus*, Worm Nodules due to: Transmission of, by Insects, **531**
    - *OPISTHORCHIS FELINEUS* Infection: Siam, **985**
    - OXYURIASIS
      - in Children: Treatment, **1003**
      - *Oxyuris* associated with
        - in Bowel, Multiplication of, without Reinfection or Passage through Stomach, **535**
      - Extract of, Skin Tests of, **535**
      - Treatment by Vasolenoform Powder, **535**
    - PARAGONIMIASIS
      - Incidence
        - Korea, 162
        - New Guinea: First Recorded Case, **512**

**Helminthiasis**—*cont.*
DISEASES—*cont.*
PARAGONIMIASIS—*cont.*
*Paragonimus westermanni* of
Development of, **170**
Hosts of, Final and Intermediate, **170**
Pulmonary: First Case Discovered in U.S.S.R., **982**
Treatment by Emetine, after Mercurochrome, **982**
SPARGANOSES
Human and Animal: Tonkin, **526**
STRONGYLOIDOSIS
Active and Latent, **997**
in Formosa, **185**
at Tucuman, Argentina, **529**
Skin Reactions in, Demonstration of, **529**
*Strongyloides stercoralis* or *intestinalis* of
Carriers of, Skin Wheals and Auto-infection in, **527**
and other Helminths, Infestation with, Skin Reactions, Specific, in, **528**
Hookworms, and *A. lumbricoides*, Larvae of, Behaviour of, in Host's Body, **993**
Larvae of, Brain and Kidney Changes due to, **532**
Life-Cycle: Diagnosis: Incidence, in the Tropics, **184**
Rôle of, in Causation of Diarrhoea, **185**
Urogenital Tract Invaded by, **529**
TAPEWORM INFESTATION
Chorea, Severe, associated with, **525**
by *Dipylidium caninum*, 525
by *Taenia saginata*, in Gall-bladder, **525**
by *Taenia solium*, Impaction of, in Ileum, **525**
Tapeworm-Ileus, **525**
Treatment, **525**
Duodenal Sound in, **183**
by Male Fern, with Duodenal Sound, **525, 526**
Standardized Method for Recovery of Head, **989**
TAENIASIS
Intestinal Obstruction, Acute, in [Kenya], **991**
*T. nana* Infestation: Italy, Abruzzi, &c., **990**
TRICHINOSIS: Symptomatology of, **536**
TRICHOCEPHALIASIS
at Petchaburi, Siam, 59
Overlooked Symptoms in, **1002**
Resistant: Successful Treatment, **1002**
Treatment by Sap of *Ficus laurifolia*, **979**
*Trichocephalus dispar*
Changes Caused by, in Mucous Membrane, **536**
Pathogenic Rôle of, **1002**
Helminthic Therapy, a Contribution to, **979**
Helminthology, Medical, in
Somalia, **508**
U.S.S.R., **977**
Nomenclature, Validity in, of Certain Generic Names at present in Use, **510**

**Helminthiasis**—*cont.*
PARASITES, *see also under the Various* DISEASES, *supra*
Animal, Various, Extracts of, Precipitin Reactions of, **204**
Clearance of, by Carbon Tetrachloride, **204**
Epidemiology of (*see also* Incidence, *infra*), **164**
Found in
Argentina, **203**
Australia: Treatment of, **167**
Cairo Police, 161
Central China, **162**
Children, Capillaroscopy in, **511**
in Armenia, **509**
in Messina, 163
Defectives in Institutions: Odessa, **203**
Dogs: Removal of, Hot Gastro-Intestinal Lavage for, **167**
Edible Fishes, **526**
Faeces of Patients: Georgia, **509**
Ferocious Wild Beasts and in Man, Mutual Relation among, **203**
Field Workers, Ceará, 57
French Colonial Troops, **161**
French Congo Natives, **203**
India
Assam, **191**
Behar, **192**
Bengal, **174,** 191, 192
Indochinese Coolies, New Caledonia, **203**
Japan, **168, 173,** 190
in Ainus, **203**
Korea (Chosen), **162**
Manchuria: Mukden, **163**
Straits Settlements, **192**
Helminths of Animals, and Human Disease, **510**
Helminths of Man and their Animal Hosts, list of, 510, 511
Infestation by
Diagnosis of, **164**
X-Ray, in Man, **164**
Insects Transmitting, 530, 531
Intermediate Hosts and Reservoir Hosts of, in China, 507–8
Intestinal
Incidence of, in
Adjaristan, **978**
Angola Natives, **508**
Calcutta Hospital Cases, **975**
Madagascar, Southern, **977**
Mlanje Native Hospital Cases, **977**
Nairobi Native Hospital Cases, **977**
Kano and Katsina, **976**
Portuguese India, **975, 509**
Index of Infection by, in
Argentine Schools, **978**
Portuguese India, **509**
Migrations and Life Histories of, Recent Work on, **980**
Ova of, Finding of, in Faeces, Cedar Oil as Aid in, **978**
in Ufa, Detected in Scrapings from Peri-Anal Folds, **976**
and Visceral, of Koreans, **980**

**Helminthiasis**—*cont.*
  PARASITES—*cont.*
      Metazoan in Korean Faeces, **976**
      Modes of Entry of, into the Human Body, **164**
      Ova of, Laboratory Methods of Faeces-Exam. for, **164**
      Physiological Varieties among, **189**
      Various, Extracts of, Precipitin Reactions of, **204**
      Worms
        Migrations and Life Histories of, Recent Work on, **980**
        Porphyrins and, **524**
        Reported for Man, Key-Catalogue of, **249**
    Cestodes
      of Mammals, **249**
      Trypanorrinchid, Larvae of, from the Pescadilla, **526**
    *Cysticercus cellulosae,* Extract of, Antibodies Produced by, **523**
    *Dibothriocephalus latus* = *Diphyllobothrium latum*
      Anomalous Specimen: Palestine, **991**
      Eggs of, in Stools, Detection Method, **179**
      Infestation by: Detroit, **179**
    *Dipylidium caninum,* Segment of, Encystment of, in Wall of Cat's Large Intestine, **184**
    *Dibothriocephalus decipiens,* of *Sparganum mansoni,* **179**
      *mansoni,* Morphology of, **990**
    *Echinostoma gotoi,* n. sp.: Intermediate Host, **173**
    *Fasciola gigantica* in Usbek Child, Tashkent, **981**
    Flukes, Heterophyid, *see* Heterophyidae, *infra*
      Liver, *see also Fasciola hepatica, under* DISTOMIASIS, *supra*
        Chemistry and Toxology of, **513**
    *Hepaticola hepatica,* Development of, **189**
    *Heterophyes Kasuradai,* n. sp.
      Japan, in Man, **173** *ter*
      Life History of, **985**
    Heterophyidae, Two New Species of, Parasitic in Mammals and Birds; Life Cycles of, **512, 985**
    *Hymenolepis* sp., Infection by, in India: Distribution: Epidemiological Significance, **990**
      *diminuta*
        in Argentina, 179
        Development of, **179**
        Does it Need an Intermediate Host? **184**
        Eggs of, Resistance of, **184**
        Infection of, in Child, U.S.A., **525**
      *intermedius,* n. sp., Evolution of, **524**
    Nematodes
      Biological Behaviour of, and Tissue Reactions of Host, Relations between, **991**
      Families and Genera, Synopsis of, **249**
      Larvae of, Wood Lice as Carriers, **997**
      Parasitic, Glycogen Contents of, Relation between, and their Migrations in the Host, **527**

**Helminthiasis**—*cont.*
  PARASITES—*cont.*
    *Physaloptera caucasica* and *P. mordens,* Identity of, **529**
    Platodaria, System of, **249**
    *Sparganum mansoni,* Development of, **179**
    *Strongyloides* genus, Infection of, Intestinal Wall in, **185**
      Life-cycle in, **184**
    *Taenia,* Hexacanth Embryos of, Movement of, **183, 989**
      *solium,* Man as Intermediate Host of, **180**
    Trematodes
      of *Anopheles maculipennis,* **173**
      Digenetic, Excretory Apparatus of, **177**
      Human, New, **173** *ter*
    *Trichinella,* Living, Thirteen Years Old, **189**
    *Trichostrongylus,* n. sp.? in Tunis, **190**
      *instabilis* Infestation in Children; Saratov, **536**
      *orientalis*
        Larvae of, Development, Structure and Migratory Course of, in Host, **190**
    Whipworms, *see also Trichocephalus, under* TRICHOCEPHALIASIS, *supra*
      Porcine, Identity, Specific of, **189** *bis*
  Recent Monographs on, **249**
  Titles of Unnoticed Papers, 204, 544, 1010

**HISTORICAL,** 329-350
  Alvine Fluxes, Woodward's Monograph on, **333**
  Black Death, The, and the Medieval Universities, **338**
    Social and Economic Results of, **339**
    *see also infra* Plague
  Cheribon, Java, Fever Epidemic in 1805, **344**
  Chigger Flea, Early Portuguese Description of, 330
  Cholera, Asiatic, Early Portuguese Description of, 330
    von Pettenkofer's Theory of Etiology of, **342**
  Dysentery in the 16th and 17th Centuries, **331**
    in the 18th Century, **333**
    in the War of the Rebellion (America), 333
  Guinea Worm, Early Portuguese Description of, 330
    Described on Cuneiform Scripts, 348
  Kabartu Disease of the Cuneiform Scripts regarded as Madura Foot, **348**
  Leprosy, Case of Robert the Bruce and, **349**
  Madura Foot, Described on Cuneiform Scripts, 348
  Mal do Bicho, 330
  Malaria in Holland, History of, **344**
    in Les Dombes and Camargne, **345**
    in the Roman Campagna, **350, 411**
  Myiases, Early Portuguese Records of, 330
  Night Blindness, Early Portuguese Description of, 330

**Historical**—*cont.*
  Pettenkofer, Max von, Theory of Etiology of Cholera, Typhoid Fever and other Intestinal Diseases, **342**
  Plague in Britain, Old Time, **334**
    Discovery of Bacillus of, **341**
    in Europe, Past and Present, **335**
    in Napoleon's Army of the East, **334**
    Sterzing Plague Ordinance (1534), **340**
    *see also supra* Black Death
  Portuguese Contributions to Tropical Medicine and Parasitology in 15th and 16th Centuries, **329**
  Sagalla Disease of Cuneiform Scripts regarded as Dracunculosis, 348
  Scurvy, Early Description of (1552), 330
    James Lind and, **343**
  Snake Poisons, Early Portuguese Observations on, 330
  Syphilis, Early Portuguese and Spanish Observations on, 331
  Typhoid Fever, von Pettenkofer's Theory of Etiology of, 342
  Woodward's Monograph on the Alvine Fluxes, **333**
  Yaws, Early Portuguese Reference to, 331
  Yellow Fever, Brazilian Epidemic of, 1684-1691, 331

**Influenza,** see *Bacillus* of Pfeiffer, *under* **MISCELLANEOUS**

**JAPANESE RIVER FEVER,** 624–5
  Area of Greatest Infection, 624
  Prophylaxis, 624
  Virus of, **624** *bis*

**JAUNDICE, INFECTIOUS,** 95–100, 704–15
  Akiyami, Researches on, **713**
  Epidemic, **704** *bis*
  Epidemic Jaundices, The, **705**
    Status and Relationship of, in U.S.A., **706**
  Epidemiology, **97, 98**
  Etiology, **97, 98**
  Experimental
    Blood Picture and Haemato-poietic Organs in, **99**
  Febrile, of Pseudo-Malarial Type and Colibacillary Origin, **855**
  Haemolytic Jaundice with Splenectomy, in Javanese Soldier, **712**
  Incidence
    Andaman Islands, **96**
    Dutch East Indies
      Java, **712**
      Sumatra: Deli, **708**
    England: Norfolk, **100**
    Holland, 708
      Delft, **96**
    Sudan, **95**
    U.S.A., Philadelphia, **100**
  Leptospira = Spirochaetes associated with
    Free, in Tap Water: Beyrouth, **715**
    Pathogenic and Rat Strains of, at Amsterdam, Comparative Work on, **100**
    in Rats, D.E.I., Weltevreden, **711**

**Jaundice, Infectious**—*cont.*
  Leptospira = Spirochaetes associated with—*cont.*
    Sero-Agglutinability of, in Cholerine with Spironemas, **710**
    Spirilla and, of Water, Isolation and Cultivation of, **713**
    Strains of
      Differentiation of
        Course of Agglutination and Lysis, **714**
      Isolated at Batavia, etc.
        Comparative Serological Investigation of, **710**
    Type of, Researches on, **97**
    *biflexa*, **714**
    *icterohaemorrhagiae*
      Filterability of, **712**
      and *L. icteroides*, Relationship of, as Determined by the Pfeiffer Phenomenon in Guinea-pigs, **709**
    *pseudo-icterogenes* (Water Spirochaete), Conversion of, into *S. icterogenes*, **711**
  Leptospiral Diseases: Diagnosis, Microscopical, Early, **709** *ter*
  Leptospirosis
    Incidence
      D.E.I., Deli, 705
      Malaya, 704 *bis*
    Tropical, or Spirochaetosis Febrilis, **705**
  Mud Fever: Silesia, **712**
  Nanukayami (Seven Day Fever); Japan, **713**
  Remarks on, **97**
  Sakushyu-Fever; Japan, **100**
  Serotherapy of, **98**
  Spirochaetal, in Scottish Miners, **704**
  Spirochaetosis icterohaemorrhagica
    Fatal Case, **707**
    Incidence
      Canada, **707**
      Dutch East Indies, **706, 708**
      Egypt, **707**
      U.S.A.
        Pennsylvania, in a Russian, **708**
    Treatment by Serum, **708**
  Urine in, Special Colour Reaction of, **99** *&c.*

**Juxta-Articular Nodules,** *see under* **YAWS AND SYPHILIS**

**KALA AZAR** (Leishmaniases, All Forms), 130–49, 629–49
  Association of, with Malaria, **631**
  Chemotherapy in, of Antimonial Compounds, **635**
  Chinese
    Leishmania of
      Development of, in *Phleb. major* var. *chinensis*, and *P. sergenti* var., **639**
      Susceptibility to, of the Striped Hamster, **137**
    Serological Studies on, **138**
  Clinical and Pathological Notes on, **630**
  Congenital, **632**

**Kala Azar**—*cont.*
- DERMAL or CUTANEOUS (Aleppo Button, Biskra Button, Clou de Mila, Delhi Boil, Oriental Sore, Tropical Sore), **147**
  - CANINE, in
    - Argentina, **148**
    - Irak, **645**
  - EXPERIMENTAL, in White Mice, **647**
  - HUMAN
    - AMERICAN
      - Histo-pathological Studies of, **143** *bis*
      - Treatment by
        - Bayer 205, **145**
        - Stovarsol, **145**
    - Concerning, **649**
    - Epidemiology of, **149, 641**
    - Incidence
      - Algeria, **641, 648** *ter*
      - Argentina, **134, 642**
        - Salta, **642**
        - Tabacal, **649**
      - England, in Indian Student, **648**
      - France: Marseilles, **144** *bis*
      - India, Portuguese, Goa: First Case, **649**
      - Italy: Naples Province, **149**
        - Sicily, 147
      - Japan, **646**
      - Palestine, **641**
      - Transcaspia, 641
      - Turkestan, 641
      - Uganda, in an Indian, **149**
    - Leishmania Vaccine, Prospects of Immunization and Treatment by, **647**
    - MUCO-CUTANEOUS = Espundia
      - Incidence
        - Argentina: Buenos Aires, **643**
        - Brazil, **144**
      - Treatment by
        - Eparseno, **145** *ter*
        - Lactic Acid, **644**
    - NASO-PHARYNGEAL; Somaliland, **644**
    - Parasite of, *see Leishmania tropica, infra*
    - Phlebotomi at Tabacal, Rôle of, in Spread of the Disease, **649**
  - Prophylaxis
    - Immunization Experiments with *L. tropica*; Development of Thrombocytobarine, **647** *bis*
      - Possible, by Leishmania Vaccine, **647**
    - Symptomatology, **149, 641**
    - Transmission, Experimental, to Man, by *Phlebotomus papatasii*, **140, 142** *bis*, **649**
    - Treatment by
      - Antimony, **146**
      - Berberine Sulphate, **644**
      - Iodobismuthate of Quinine, **146**
      - Leishmania Vaccine, possible, **647**
      - Modern Methods, **146**
  - and Visceral Leishmaniasis: Argentina, **642**
- DERMAL LEISHMANOID, **635**
  - in India, 635
  - Parasite of, **635**
  - with Positive Flagellate Culture from Peripheral Blood, **635**

**Kala Azar**—*cont.*
- Diagnosis, Early, **632**
- EXPERIMENTAL
  - in Hamsters: Treatment, **136**
  - Histopathology of, **643**
- Flagellates
  - Development of, in Chinese Sandflies fed on Hamster Infected with *Leishmania donovani*, **133**
  - and Herpetomonads, Differentiation of, by Serological Reactions and Fermentation Tests, **139**
- Incidence
  - Age, **131, 148,** 629, 630, 632-3, 634 *bis*, 635, 636
    - Infants, Leucopenia in, Pathogeny of, **639**
  - Geographical
    - Africa, North, **130**
    - Argentina, **134**
      - First Indigenous Cases, **135** *bis*
    - China, 133, **137, 138,** 507, **639** *bis*
      - Shantung, **130**
    - France, 148
    - Greece: Messenia, **629**
    - India, 632 *bis*, 633
      - Assam, 630, 636 *bis*
      - Calcutta, 635, 640
      - Madras, **629**
    - Italy
      - Bari and Trani, **148**
      - Naples, 635
      - Sicily: Catania, in Children, Age of those affected and Distribution of, in Altitude, **131**
        - Palermo, 632, 633
      - Siena, **640**
    - Panama, 640
    - Peru
      - Amazonas, Distribution in, **642**
    - Russian Turkestan
      - Samarkand, **130,** 630
      - Tashkent, 634
    - Syria, **148** *bis*
  - Race, 629
  - Sex, 629
- Indian, *Conorhinus rubrofasciatus* and, **134**
- Leishmania (Herpetomonas) associated with All Forms
  - of Chinese form
    - Development of, in *Phleb. major* var *chinensis*, and *P. sergenti* var, **639**
    - Susceptibility to, of the Striped Hamster, **137**
  - Cultivation of, in, and from
    - Insects and Plants, **139**
    - *Phleb. papatasii*: Behaviour of, **645** *bis*
  - Cultures of, Resistance of, to Cold, **138**
  - Does one Occur in Goats? **640**
  - Genus, The, of, **140**
  - and Herpetomonads, Biological Relationships of, **138**
    - Comparative Studies of, 139
  - Structure of, Details of, **147**
  - *donovani*
    - Development of, in the gut of *Phleb. papatasii*, **638**

**Kala Azar**—*cont.*
- Leishmania—*cont.*
  - *donovani*—*cont.*
    - Flagellate Morphologically Identical with, in *Phlebotomus argentipes*, **133**
    - in *Phlebotomus argentipes*
      - Forms found, Infectivity of, **638**
      - Life-History and Morphology of, **132**
      - Massive Infection of, in Buccal Cavity, **132**
    - Resistant Non-Flagellate and O Bodies in Old Cultures of
      - Mode of Formation of, and Morphology, **637**
      - Relation of, to Infections, **637**
  - *tropica*
    - and *Herpetomonas papatasii*, Identity of, **143, 645**
    - Infection by, Natural and Experimental, of *Phleb. papatasii*, **141**
- Leishmanias, the, Relationship of, **132**
- Leishmaniasis Visceralis : Spain : Epidemiology, **640**
- Lens Opacities as Sequel to, **633**
- Mediterranean or Infantile, **640**
  - Treatment of, **635**
- *Phlebotomus* in relation to, **132** *bis*, **133** *bis*, **140, 141, 142** *bis*, **143, 636, 638** *bis*, **639**, 641, 642, 643, **645** *bis*, **649**
- Prophylaxis
  - Control on Tea Estates, **636**
  - Control by Therapeutic Measures, **636**
- Report of Case, **640**
- Stenosis, Chronic Laryngeal, Complicating, **137**
- Susceptibility to, of the European Hamster, **137**
- Titles of Unnoticed Papers, 149, 649
- Transmission Experiments
  - Mode of, **134**
  - with *Phleb. argentipes*, **636**
- Treatment, **633**
  - Various Methods
    - Antimonials
      - Chemotherapy of, **635**
      - Cure, **630**
    - Antimony
      - Organic Compounds of, Advantages of, **136**
      - Pentavalent Compounds of, **135**
      - Rectally, **634**
    - Eparseno, 635
    - Neostam, Stibamine Glucoside, **634**
    - Stibenyl, **130, 634**
    - Stibosan : Results in 104 Cases, **135**
    - Stiburia, Rectally, **634**
    - Urea Stibamine : Cure, **640**
- and Typhoid, Clinical Similarity between, 155

**LABORATORY REPORTS**, 812–21
- Belgian Congo : Léopoldville (1925), 817
- Federated Malay States : Med. Research Inst. (1924), 819 (1925), 820
- Gold Coast : Accra, Med. Research Inst. (1925–6), 817
- Kenya : Med. Research (1924 & 1925), 813
- Mauritius : Bacteriol. Lab. (1925–6), 818

**Laboratory Reports**—*cont.*
- Nigeria : Lagos : Med. Research Inst. (1925), 815
- Pasteur Institutes
  - Algeria (1925), 812
  - Tunis (1926), 812
- Royal Soc. of Trop. Med. & Hygiene : Transactions of Lab. Meeting, 821
- South African Inst. for Med. Research (1925), 818
- Uganda (1925), 814

**LEPROSY**, 205–21, 545–59, 904–22
- Acquired in Lazaret, **212**
- Allergy, Lepra-Specific Induced, and Active Immunization against, **559**
- Bacteriology of, **556**
  - *B. leprae*
    - Chemistry of, **921**
    - Cultivation of, **555, 556**
    - and *B. tuberculosis* ; Micro-chemical Behaviour of, **922**
    - Persistence of, in Deep Foci, **908**
  - Organism, Unidentified, from Acute Vegetative Endocarditis in Culion Cases, **922**
- Biological Researches on, **213**
- Blood in
  - Blood-Chemistry Studies in, **922**
  - Blood Picture, **919**
  - Blood Serum Calcium in, **558**
  - Red Cell Sedimentation in, Velocity of, **215**
- Books on, **596, 681, 943**
- Chemotherapy
  - Chaulmoogric Acid, Esters of, **217**
    - Ethyl Esters of the Fatty Acids of, Physiological Action of, **554**
- Complement Deviation in, with Defatted Streptothrix Leproides Deycke, **921**
- Contagion of, **548** *bis*
- Curability of, at Early Stages, 209, 214
- Cure, Natural, in, **910**
- Diagnosis
  - Early, Iodine Reaction in, **553**
  - Fermentation, **557**
  - New Method for, Value of, **921**
- Early, in Lepers' Children, **210**
- Early Signs of, **549**
- Experimental in
  - Monkey, **554, 555**
  - White Mice, 555
  - White Rat, **554**, 555
- Eye-affections and Symptoms in, **481**, 549
- Gland Infection in, **213**
- Gland Puncture Findings in, **910**
- Iconography of, **208**
- Incidence
  - Age, 208, **210**
  - Factors Influencing, **904**
  - Geographical
    - Abyssinia, 551
    - Algeria : in Natives, **205**
    - Argentina, **207, 208**, 552, 557
      - National Leprosy Law of
        - Mode of Carrying of, into Practice, **545**
        - Problem of, in, **545**

- **Leprosy**—*cont.*
  - Incidence—*cont.*
    - Geographical—cont.
      - Argentina—*cont.*
        - Buenos Aires, **207**
        - Hospital Muniz, 207
          - Statistics of, **208**
      - Australia, Problem of, **208**, **548**
      - Brazil, **206**, 220 *bis*, **396**, **546**, 548, **596**, **907**, 917, 918, 921
          - Conference on, and Statistics of, **207**
        - Northern, Ceará Districts, 57
      - China
        - Canton, **206**
        - Kwangju, **549**
      - Comoro Islands, 56
      - Costa Rica, 58
      - Cuba, **549**
        - Prophylactic Measures Suggested, 209
      - Dutch East Indies, 910
        - Java, 559
        - Moluccas, 559
          - Amboina, **908**
      - Dutch Guiana; Surinam, **908**
      - France, 205, **908**
        - Paris, 205
        - Toulon, **549**
      - French Colonies, **205**
      - French Guiana, **906** *bis*
      - Holland, **549**
        - Gouda, in the past, 208
      - India, 52, 910, **943**
          - Factors Influencing, 904
        - Bengal-Bihar Border Line, **904**
          - Report on Survey Work, **905**
        - and Burma: Mission to Lepers in, Medical Work of, **209**
      - India: Portuguese, **547**
      - Italy, 919
      - Japan, 557, 920
        - Okayama Prefecture, Statistical Study of, **205**
      - Korea, **205**
      - Madagascar, 56
      - Palestine, **547**
      - Philippine Islands, **214** *bis*, **550**, 908, 909, 910
        - Culion Colony, 210, **922**
        - Topographical Distribution in, **546**
      - Ruanda-Urundi, 55
      - Somaliland, **553**
      - Spain, 920
      - South Africa, 553
        - Union of, Report on, of Dept. of Public Health, **905**
      - Syria, **908**
      - U.S.A., **219**
        - Louisiana, 553
  - Infection with, 549
  - Kahn Precipitation Reaction in, **214** *bis*
  - Lepers, Negative, Studies on
    - I. Persistence of Bacilli in Deep Foci, **908**
    - II. Importance of Nasal Lesions, **909**
    - III. Problem of Relapses, **909**
  - Lepra Reaction, Alkaline Treatment of, **551**
    - Muchow-Lewy, **557**
  - Nasal Lesions in, Importance of, **909**

- **Leprosy**—*cont.*
  - National Leper Home, U.S.A.: Statistics, Treatment, &c., **219**
  - Nerve Enlargement in, **212**
  - New Ideas on, from Points of View of Hygiene and Therapy, **209**
  - Nodular, **212** *bis*
  - Notification of, in Bosnia and Hertzegovina, 548
  - Old Time, Notes on, Case of King Robert the Bruce, **349**
  - Orthopedic Problems in, **553**
  - Pathogeny, **213**
  - Prognosis, **214**
  - Prophylaxis
    - Argentinian, **207**, **545** *bis*
    - Brazilian, **206**, **907**
    - Dutch, for Amboina and Surinam, **908**
    - French, **205**
    - Isolation, Colonies, Asylums, etc., 545, 546, 547, 548
      - Problem of, View on, **551**
    - Lazarettes, Segregation, &c., 206, **206**, **208**, 208, **212**
    - Leper Home, Model, in Cuba, **549**
    - Leprolin Inoculation, 559
  - Relapses in, Problem of, **909**
  - Representations of, **208**
  - Rubino's Leprosy Test, **557**
  - Self-Limiting Phases of, **211**
  - Serological Findings in, with Special Reference to Non-Specific Determinations, **556**
    - Reactions in, **551**, **556**, **557** *quat*, **919**
      - New, **215**
      - Serum and Ferment in, **920**
      - Serum-Formalin in, **921**
      - Skin, Specific, **216**
      - Studies on, **555**, **920**
  - Syphilis as Influencing, as Indicated by the Wassermann Reaction, **558**
  - Titles of Unnoticed Papers, 221, 559, 922
  - Transmission, **212** *sept.*, 553, by
    - Contact, **548** *bis*, 549
    - Insects, **555** *bis*
  - Treatment, **216**
    - in Chosen (Korea), **551**
    - at Culion Leper Colony, Results of, **550**
    - Dispensary, in Abyssinia, **551**
    - Discussion on, **911**
    - French, **205**
    - Modern, **553**
    - in Prata Lazaropolis, Pará, **206**
    - in São Sebastião Hospital, Brazil, **220**
    - Two Years' Experience in, **552**
    - Various Means
      - Antileprol, 551, **917**
        - (Intravenous) and Other Drugs, **220**, **917**
      - Anti-tuberculous Vaccine B.C.G., **552**
        - Curative Action, **218**
      - *Carpotroche brasiliensis*, **218**
      - Chaulmoogra Oil
        - and Derivatives, **219**
        - Discounted, 553
        - Ethyl Esters of, in Chosen: Results, **551**
        - Wassermann Reaction given by Serum at beginning of Treatment, 555

**Leprosy**—*cont.*
  Treatment—*cont.*
    Various Means—*cont.*
      Copper Preparations, **218**
      Cryotherapy in Mixed Case, **218**
      E.C.C.O. Mixture of Muir, **553**
      Eparseno, Injections of: Results, **553**
      Gold, **916** *bis*, **917** *bis*
      Ionization, **919**
      Krysolgan, **916** *bis*
      Linear Incision of Thickened Nerves, 553
      Sanocrysin, **917** *bis*
      Sympathectomy, **918**
      Tartar Emetic, **918**
        with Antileprol, Intravenously, **917**
      Tuberculin T.O.A., **918**
      Vaccine, **212** *oct.*
      of Wassermann-Positive Cases, by New Oil-Soluble Mercury Preparation, **217**
  Tuberculoid, **211**
  Years Between, The. A Medical Retrospect, **218**

**MALARIA,** 251–85, 723–59
  *Anopheles* in relation to
    Adult, Domiciliary Measures against, **284**
    Distribution
      French Indo-China, **251** *ter*
      Saratov Region, **255**
      U.S.A., Atlantic Coast, **257**
    Species known or Suspect as Carriers
      *pseudopunctipennis* in the Argentine, **725**
  Aorta in, **262**
  Arthritis, Relapsing, in, **262**
  Association with, of Kala Azar, **631**
  Autochthonous, and Somnambulism, **263**
  AVIAN
    Chemotherapeutic Studies in, **272**
    Macrogametes and Microgametocytes in, Appearance and Numbers of, **748**
    Plasmochin in, **264**
    *Plasmodium praecox* of, Asexual Reproduction of [in Canaries], without Loss of Vitality, **276**
    Quinine Prophylaxis in, *per os*, **273**
  Bibliography of, up to 1914, **255**
  Blood Conditions in, **749**
    Anaemia, Malarial, Leucocytes and Arneth Count in, Changes in, **275**
    Arterial Pressure, and Viscosity in, **262**
    Blood Urea Increase in, **274**
    in Experimental, Chemical Examination of, **274**
    Haemoglobinuria in, Pathogenesis of, **669**
    Quinine in, Minute Quantities of, Estimation of, **273**
  Books on, **76**, **326**, **411**, **414**, **682**, **683**, **771**, **772**, **942**
  Carbohydrate Metabolism in, **752**
  Central Nervous System in, Changes in, **734**
  CEREBRAL, **260**, **734**
    Unusual Features in, **260**
  Cerebrospinal Fluid in, Excess in, of Albumin, **747**

**Malaria**—*cont.*
  CHRONIC
    and Mania, **757**
    Treatment by Smalarina, **743**, **744** *bis*
  Clinical Investigations in, **748**
  Complement Fixation Reaction in, **746**
    Malaria Antigen for, Researches on Production of, **746**
  Concerning, **732**
  CONGENITAL, **264**
    at Léopoldville, Belgian Congo, **733**
  Diagnosis, Differential, from Other Fevers, Quick and Simple Test for, **730**
  EXPERIMENTAL: Blood in, Chemical Examination of, **274**
  Incidence
    Age
      Babies and Young Children, **284**, **733**, **756**, **757**
    Altitude of 4,000 Metres, **731**
    Class, 270, **725**, 731, 732, 734, 742, 755 *bis*
    Geographical, *see also under each Form*
      Algeria, **755**
      Argentina, 271, **725**, 756
          Relations between Psychosis in Children and, **757**
        Buenos Aires, 263, 735
        Punahuasi Lead Mines, at Altitude of 4,000 Metres, **731**
      Australia, Acquired in Sydney, **264**
      Belgian Colonies
          Quinine Treatment in, Risks from, 267
        Elizabethville, 744
        Léopoldville, 733
        Ruanda-Urundi, 55
          Character of, 55
      Brazil, 264
        Céara, 57
        S. Paulo State: Epidemiology and Prophylaxis, **725**
      Camp Stotsenburg, **758**
      Caribbean Sea Shores, 732
      Caucasus, S.E., Azerbaidjan, Surveys of, **254** *quat.*
      China, **251**, 507
        *Ascaris* present, 262
        Review of Cases Treated, **260**
      Colombia, W. Coast, **56**
      Comoro Islands
        Great Comoro, 56
        Mayotte, 56
      Costa Rica: Endemic, 58
      Dutch East Indies, Tegal Epidemic (1926), **723**
      England, Earliest Historical Record of, 348
      Federated Malay States, Report for 1925, **723**
      Formosa, **724**
        Spread of, and Prevalence, **252**
      France: Rhone Region Past and Present, **256**, **345**
      French Colonies, **737**
      French Indo-China, **251** *bis*
        Dalat, **758**
      Georgia, Reduction of, Stabling of Animals as Factor in, **727**

**Malaria**—*cont.*
  Incidence—*cont.*
    Geographical—*cont.*
      Germany: War Infections, Unfounded Anxiety on, **757**
      Gold Coast, Chronic, Mania in, **757**
      Haiti, in Emigrants to Cuba, **725**
      Holland, History of, **344**
      India, 52, 264, 270
          Map of, **253**
          Andaman Islands, 260
          Assam, **253**
          Bengal: Dispensary Treatment of, **266**
          Darjeeling, with *Ascaris* Infection, **263**
        Portuguese: Goa, **756**
      Italy
          Results of Antimalarial Measures, **727**
        Campagna, History of, **350, 411**
        Istria, **285**
        Milan (Province), **256**
      Jugoslavia: Skradin, 261
      Kenya, **755**
        Kisumu, **254**
      Korea, **252**
      Levant, **255**
        General Morbidity of, **255**
      Macedonia, Quinine-resisting Character of, 737
      Malay States, Deadliness of, 794
      Mauritius: Fort George, **258**
      Palestine: Antimalarial Work, **755**
        Jaffa, 736
      Panama, 232
      Philippine Islands, 271, **284, 724**
      Portuguese Guinea, Endemic Index of, **726**
      Réunion: Severe, 56
      South Africa: Cerebral, **260**
      Soviet Republic of Volga Germans, **255**
      Transjordania, 744
      Turkestan; Ocular Complications, **480**
      U.S.A.
        Alabama, in Impounded Area, **256**
        Eastern Army Stations, **257**
      Uruguay, 264
  Incubation Period in, **258**
  Inoculation Malaria
    Abortion of, by Salvarsan and Spirocid, **280**
    Action of, Mode of, **282** ***bis***
    Blood Groups and, **754** ***bis***
    Gametocytes in, Early Appearance of, **753**
    Parasites in, Enumeration of, **279**
    Plasmochin in, **265**
    Schizogony, Atypical, in, **281**
    Suppression of, by Eosin, **280**
    Therapeutic Tests with, **283**
    Treatment by, of
      Cerebro-Spinal Syphilis by ***Plasmodium vivax*, 753**
      G.P.I., **277** ***ter*, 278, 752** ***bis***
        Care and Management of, **751**
        Cerebro-Spinal Fluid in, after, **280**
        Histopathologic Observations in 13 Cases, **751**
        Leucocyte Counts, Hourly, in, **754**
        Review of Three Years' Work, **750**

**Malaria**—*cont.*
  Inoculation Malaria—*cont.*
    Treatment by, of—*cont.*
      G.P.I.—*cont.*
        with Simultaneous Inoculation of Relapsing Fever, Course of the Two Infections, **152**
        Value of, **277**
      Gonorrhoea, Chronic, **282**
      Leucaemia, **282, 754**
      Syphilis of Central Nervous System, **279** ***bis***
      Tabes, **278, 281**
    Treatment of, by Plasmochin, **264, 265**
    Type of Fever, **278**
  Influence of, on Progress of Civilization, **257**
  Kidney Affections in, **735**
  LATENT
    Berberine as Provocative in, **745**
    Diagnosis in, **258, 745**
  and Lymphocytosis in Normal Blood of Goanese, **756**
  Malaria Map of India, **253**
  Malarial Appendicitis, **263, 735**
    Eruption, **733**
    Fevers, Investigations of, **746**
    Gastro-Enteropathies, **263**
    Haemoptysis, **261**
    Neuralgias, of Cranial Nerves, 261
    Orchitis, **261, 757**
    Remedies
      Pathological Changes due to, in Peripheral Hearing Region, **828**
      Some Alleged, **746**
    Vomiting, Adrenalin for, **271**
  Meningococcaemia Simulating: Turpentine Abscess: Cure, **247**
  Nerve Manifestations of, **261**
  Ocular Complications of: Turkestan, **480**
  Pagniello's Sign in, **736**
  Passing of, **728**
  Parasites of (*see also* Plasmodia, ***infra***), Enumeration of, in Therapeutic Malaria, **279**
  Pig-Susceptibility to, queried, **750**
  Plasmochin
    Bird Malaria and, **264**
    Chemistry and Development of, **264**
    in Inoculation and in Natural Malaria Treatment, **265** ***bis***
  Plasmodia
    Gametocytes
      Development, in Mosquitoes Infected from Quininized Patients, **748**
      Incidence of, Comparative, in Untreated and Briefly Treated Malaria, **732**
      Macrogametes and Macrogametocytes in Human and Avian Malaria, Appearance, Sex-distribution and Relative Numbers of, **276, 748**
    Transmission of to Animals, Possibility of, **276**
  *Plasmodium*
      Pigmented, from a Monkey, **756**
    ***falciparum*, Atypical Development of, 749**
    ***praecox*, Asexual Reproduction in, without Loss of Vitality, 276**

- **Malaria**—*cont.*
  - *Plasmodium*—*cont.*
    - *tenue*, Production of, Side-Light on, **275**
    - *vivax*
      - Action on, of Stovarsol, Orally, **743**
      - Development of, Atypical, **276**
      - Gamete-free Strains of, **278**
  - in Pregnancy
    - Four Cases of Deaths from, **738**
    - Quinine in, **737**
  - Prophylaxis
    - Animal (Stabling near Dwellings), **727**
    - Anti-Malaria and Anti-Anopheles Measures
      - Brazilian, S. Paulo State, **725**
      - Formosan, **724**
      - Italian, **350, 411**
        - Results, **727**
      - Palestinian, **755**
    - Anti-Malarial Research, Future of, **257**
    - Domiciliary Measures against Adult *Anopheles*, **284**
    - Gambusia for Control of, in Istria, **285**
    - Quinine,
      - Algeria, **755**
      - Kenya, **755**
  - QUARTAN, in Rumania, **758**
  - Quinine
    - Action of, in, Mode of, **738**
    - and : Plea for Moderate Dosage, **736**
    - Minute Quantities of, in the Blood, Estimation of, **273**
    - in Pregnant Patients, **737**
    - Studies on, **273**
    - and its Salts : Employment of, in French Colonies, **737**
    - Synthetic, *see* Plasmochin, *supra*
  - Quinine Intolerance, Practical Mode of Treating, **267**
  - Quinine Resistance in, **737**
  - Quinine Treatment of Pulmonary Affection Simulating Tuberculosis : Cure, **734**
  - Quininized Patients, Mosquito Vectors Infected from, Gametocyte Development in, **748**
  - Pulmonary Affection in, Simulating Tuberculosis, Cured by Quinine, **734**
  - Relapse Cases
    - Arsenic and Antimony in, **270**
    - Fasting in Causation of, **757**
  - Round Worm Infestation and, **262**
  - Spleen in
      - Treatment by Radio-therapy, **746**
    - Enlarged
      - Details of, Post-mortem, **283**
      - Rupture of, **264, 736**
  - Spleen Index, Determination of, **284** *bis*
  - Spleen and Liver Reticulum in, **259**
  - Spleen-Palpation, Enquiry into, based on Conditions of the Enlarged Spleen Post-mortem, **283**
  - Splenomegaly
    - Tropical, of Strong and Shattuck, **726**
    - Uncomplicated : Surgical Treatment of, **271**
  - Statistics of, Italian, **256**
  - SUBTERTIAN, Aestivo-Autumnal, Malignant Tertian, or Pernicious
- **Malaria**—*cont.*
  - SUBTERTIAN—*cont.*
    - Central Nervous System in, Pathology of, **259**
    - Epidemic (probably) of, at Cheribon, Java, 1805, **344**
    - Meningeal Form, **264, 735**
    - Plasmodia of, Atypical Development of, **749**
    - Quinine-Resistant Strain of, **732**
    - Treatment by Stovarsolate of Quinine, **270, 742**
  - Suppurations in, Aspect of, **261**
  - Symposia on, **729** *bis*
  - TERTIAN, BENIGN
    - Costa's Novocaine-Formalin Reaction in, **749**
    - G.P.I. associated with, **281** *bis*
    - Insulin and Glucose, Effects of, on, **752**
    - Plasmodia of, Atypical Development of, **276**
    - Primary
      - Fever Curve in Early Stage of, **731**
      - in Russia, **731**
    - Treatment by Sod. Stovarsol, Action of, **269**
  - Therapeutic, *see* Inoculation, *supra*
  - Titles of Unnoticed Papers, 285, 758–9
  - Treatment
    - Book on, **497**
    - Experimental Studies in, **272**
    - Isolation Urged, **272**
    - Various Forms
      - Adrenalin
        - Lymphocytosis Induced by, **274**
        - for Vomiting, **271**
      - Arsenic and Antimony, **270**
      - Berberine, **269**
        - in Latent Cases, **745**
        - Orally, with Quinidine . . ., **268**
      - Cadmium, **745**
      - Cinchona and Quinine, **267**
      - Dispensary, in India, **266**
      - Mercurochrome, 232
      - Mercurochrome Soluble, 220, **271**
      - Neosalvarsan, 232
      - 914, Ill-Effects of, **270**
      - Paludismol : Trial, **745**
      - Peracrina, **744**
      - Plasmochin, in Natural Infection and in Inoculation Malaria, **264** *bis*, **265** *bis*, **738**, **739** *bis*, **740**, **741** *bis*
        - Poisoning by, **741**
      - Quinine (*q.v. also supra*), Risks from, 267
        - Intramuscular, **267**
        - Stovarsolate of, **270, 742**
      - Quinothorium, **268**
      - Smalarina, **744**
        - in Chronic Cases, **743, 744**
      - Sod. Stovarsol in Benign Tertian, **269**
      - Soluisin, **270**
      - Spa, Applications to, of Recent Work, **69**
      - Specific, **268**
      - Splenectomy, **736**
      - Stovarsol, **742** *bis*, **743** *bis*
        - Oral, **269**
      - Stovarsolate of Quinine, **270, 742**

**Malaria**—*cont.*
  Treatment—*cont.*
    Various Forms—*cont.*
      Surgical, of Uncomplicated Malarial Splenomegaly, **271**
  and Tuberculosis, Antagonism between: Proposed Malariatherapy, **69**
  Untreated and Briefly Treated, Comparative Incidence in, of Gametocytes, **732**
  War, Course of, **260**
    German Anxiety on, **757**
  Wassermann Reaction in, **748**

***MEDICAL ZOOLOGY** (*see also under Diseases concerned*), 385–410, 419–440, 859–60, 861–903
Acari, parasitic on rats, **898**
  in Urinary Tract, **437**
Acariasis, Pulmonary, in Monkeys, **438**
*Aedes aegypti* (see *S. fasciata*), 421, 425
*Agkistrodon* sp., **405, 900**
*Alysia manducator*, Habits, **894**
Amoeba, Fresh Water, Encystment, **868**
  Infections in N. Nigeria, **864**
  Parasites of, **390**
Anopheles of Brazil, *Nyssorhynchus* Group, **423**
  Breeding in Sea Water, **425**
  of Brian Valley, Venetia, **884**
  Eggs, Resistance to Desiccation, **882**
  Habits of Malaria-transmitting, **880**
  of Haiti, Resting Position of, **426**
  of India and Ceylon, Distribution, Identification, **881** *bis*
  of Italy, **424** *bis*, 859
  of Japan, **422**
  Larvae, Food of, **882**
    Biology of Bogs in respect to, **883**
    of India, Ceylon and Malaya, **772**
  of Malaya, **419**
  Notes, **427**
  of Russia, **424**
  in Shelters, Sex Incidence, **882**
*Anopheles annulipes*, Breeding Places, **879**
  *hyrcanus*, Breeding Places in China, **884**
  *maculatus*, Breeding sites in Cochin China, **427**
  *maculipennis*, Biology of, **426** *bis*, **859**
    Hibernation of, in Georgia, **427**
      in Ukraine, **427**
    Malpighian Tubes of, **885**
      Two Races in Holland, **880, 883**
  *pseudojamesi*, n. sp., in Bengal, **883**
  *quadrimaculatus*, Annual Broods of, **881**
  *ramsayi & jamesii* in E. India, **884**
  *sinensis*, Formosa, Seasonal Prevalence, **425**
  *tibiamaculatus* in S. Paulo, **427**
Anophelism without Malaria about Amsterdam, **879, 880**
Antivenene, Collection from Rattlesnake, **406**
Arachnidism, **401**
Arthropods, Bloodsucking, of China, **419**
*Bartonella muris*, Study of, in Rats, **875**
  in Viscera, **875**

**Medical Zoology**—*cont.*
Bee Venom, Effects of, **403, 895**
Beetles, causing Dermatitis, **401** *bis*, **895**
Bird Malaria, Changes in Liver, **398**
  Chemotherapy, **399**
  Periodicity, **398**
Bristle Worms, in Human Body, **439** *bis*
Bug, with Irritant Secretion, **409**
Calliphora Larvae, Effect of Starvation on, **432**
  Growth of, **432**
  in Lachrymal Sac, **890**
Calliphoridae from Australia & S. Pacific, **890**
Caterpillar Dermatitis, **400** *bis*, **894**
Centipede(s), Venom, Action of, **404, 409**
  of Tadla, Morocco, **407**
*Chagasia fajardoi*, Study of, **884**
*Chilomastix mesnili*, in Human Faeces, **393**
China, Parasites of, **385**
Cobra, Venom Haemolysis, **407**
Coccidiosis in Mammals, **397**
  of Pigs, **873**
  in Rabbits, Treatment, **398**
Coccidium(a), Host Parasite Specificity, **873**
  Oocysts in Faeces of Rats, **873**
  Sporozoits, excysted in Gut, **397**
Cockroaches and Disease, **436** *bis*
  and Giardia Cysts, **871**
*Cordylobia anthropophaga*, Immunity-Experiments, 861
Correspondence on, **859**
Councilmania, Excystment in Culture, **868**
Cultivation Method, Diagnosis by, **385, 391**
  of Trichomonas, **392**
Cytoplasmic Counterstaining, **389**
Dutch East Indies, Poisonous Creatures of, **409**
*Embadomonas* sp., in Kisii Native, **397**
*Endamoeba gingivalis*, Effect of Drugs on, **391**
  Experiments with, **391**
  Ingestion of Leucocytes, **391**
*Eristalis tenax*, Parasite of Man, **890**
Faeces, Examination of, at Calcutta, **866**
  Routine, **440**
Fishes for Control of Mosquitoes, **440, 898**
Flagellate(s), Appearance of Stools containing, **866**
  *Enteromonas hominis*, **872**
  Intestinal, Culture Method and Diagnosis, **391**
    in Bologna, **869**
  of Plants, **872** *ter*
Flea Bites, Reaction to, **434** *bis*
Fleas of Domestic Animals, C. Asia, **894**
  of Rodents of Lagos, **434**
  of South African Rodents, **894**
  in South-East Russia, **894**
  of Spermophile and Plague, **434**
*Giardia intestinalis*, Duodenal Infestation, **871** *bis*
  Cysts and Cockroaches, **871**
  and *G. canis*, **395**
*Giardia lamblia* from Man infecting Rat, **870**
Giardiasis in Children, **869**
  in Man, Prevalence and Symptoms, **393, 394, 395, 869**
  and Pernicious Anaemia, **394**
  of Rabbit, Number of Parasites, **871**

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*** The MEDICAL ZOOLOGY Section of this Index has been prepared at the Bureau, and a different system from that adopted for the other Sections has been followed.**

**Medical Zoology**—*cont.*
*Glossina morsitans*, Limits near Elizabethville, **893**
  Bionomy, 891
  Control, 862, 892
    in Sudan, 893
  *tachinoides*, 891
Hamster, Striped, New Parasites of, **389**
  Freedom from Ectoparasites, **389**
Herpetomonas, Parasite of Rhinoestrus Larvae, **396**
  Transmission of, **396**
Host Parasite Relations in Human Protozoa, **387**
  Specificity in Coccidia of Mammals, **873**
Hippelates Flies in California, **433**
Hippoboscidae, Head and Mouth Parts, **433**
Hyperchira sp., Dermatitis from Larvae, **400, 894**
Immunity in Invertebrata, **386**
  Metazoan, Experimental, **861**
Insect Pests, **900** *bis*
*Ixodes ricinus*, Tick of Cold Regions, **436**
Larvicide, Value of Cresols, **420**
*Lathrodectes mactans* Bites, Clinical Study, 433, **895, 896**
Leeches, Deglutition of, in C. Asia, **899**
Limnaea and H Ion Concentration, **440**
Lithobius sp., Blood Antitoxic to Venom, **409**
Malacology, Medical, **439**
Mammalian Reservoirs of Virus, **863**
Metazoan Parasites, Immunity against, **861**
Microfilaria in Monkey, **390**
Mosquito(s), Action of Poisons on, **879**
  of Anatolia, **885**
  Bionomics, **420**
  of Brazil, **884**
  Bred from Tree Holes, **424**
    from Coconut Palms, **877**
  Breeding Places, British Guiana and Queensland, **878** *bis*
    Whitening of Pots as deterrent, **427**
  of California, **876**
  of Cochin China and Annam, **422**
  and Control by Fish, **898**
  Diverticula and Salivary Glands, Function of, **879**
  of Elizabethville and the Katanga, 501, **876**
  of Guayaquil, **423**
  of Haiti, **885**
  and H Ion Concentration, **440**
  of Hong Kong, **421**
  of Lower Fraser Valley, British Columbia, **500**
  of Malaya, Researches, Distribution, **419, 422**
    Notes, **421, 422**
  of Sydney, **876**
  of Transcaucasus, **885**
Moth Dermatitis, **401**
Myiases, Portuguese and Spanish Accounts of, **330**
Myiasis, Flies causing in S. Africa, **431**
  Intestinal, Case of, **431**
  by *Eristalis tenax*, **890**
  of Lachrymal Sac, **890**
  in Reindeer, Life History of Flies, **431**
  Urinary, N. of England, **430**
Myriapod Venom, poisons Crayfish, **409**
New York, Report of Entomologist, **419**

**Medical Zoology**—*cont.*
Nomenclature, Zoological, **863**
*Nucleophaga*, sp., parasitic in *Endolimax*, sp., **390**
Nyasaland, Report of Entomologist, **862**
*Ornithodoros* sp., S. America, **897**
*Pachydrilus lineatus* in Human Body, **439** *bis*
*Paederus*, sp., causing Dermatitis, **401** *bis*, **895**
Parasites, External animal, S. Africa, **431**
  Intestinal, Detection of, **385** *bis*
    in N. Nigeria, **864**
  in Turkestan, **865**
  in Rats, Bologna, **872**
  Metazoan, Immunity Against, **861**
Parasitic Infections in China, **385**
*Phlebotomus araozi*, **430, 889**
  of Argentine, New Species, **889**
  *Argentipes*, 428
  of Assam, **886**
  in Aunis, **429**
  in Bombay City, **428, 889**
  *caucasicus* and *sergenti*, **430**
  Food Canal of, **429**
  Genitalia of, **886**
  Indian Species, Notes on, **886** *bis*
  Minutus Group, Collection of, **887**
  in N. China, **428**
  of N. Tunis, Researches on, **888, 889**
  *papatasii*, Breeding of, **887**
  *perniciosus*, Life Cycle, **888**
  in S. Paulo, **430**
  of Upper Volta, **889**
*Plasmodium praecox*, Infection, Chemotherapy, **399**
  Interrelation between, and Host, **874**
  Species in Bats, Belgian Congo, **399**
Polychaete Worm, in Nasopharnyx, **899**
Polynesia and Melanesia, Researches in, **941**
Premunition and Blood Protozoiasis, **387**
Porocephalus, Unsettled Phenomenon, **438**
Protozoa, Action of CO on, **388**
  in Armenia, **865**
  Detected by Sigmoidoscope, **866**
  Host Parasite Relations, **387**
  Intestinal, Action of Mercurochrome, **389**
  in Japanese, **386**
  in Monkeys, **867**
  in Nebraska, **390**
  of Pitcher Plant, **390**
  Transmission of Human, **387**
Protozoiasis, Human, and Premunition, **387**
Protozoological Technique, **389**
*Rhodnius* sp., Bionomy, **435**
  *prolixus*, Life History, **435**
Rodents, Ecto-Parasites of, **434, 894**
  Blood of Splenectomized, **875**
Sand Flies, *see* Phlebotomus
Sarcosporidia, Changes in Myocardium, **874**
Sarcosporidiotoxin, Action of, **399**
Scardola Fish, in Anti-malarial Work, **440**
Scorpion Sting, Case of, **403**
  in Ear, **899**
Simuliidae, Buccal Apparatus of, **429**
Snake(s), Aglyph, Saliva of, **406**
  Bite, by Agkistrodon, Treatment, **900**
    Case of [Ceylon], **405**
    Problem in N. & C. America, **900**
    of Rattlesnake, First Aid Treatment, **900**
    by Tiger-Snake, Treatment, **901**

**Medical Zoology**—*cont.*
- Bite, by Agkistrodon, Treatment—*cont.*
  - Treatment in S. America, **405**
  - of Viper, Serum Treatment, **404** *bis*
- Cobra, Venom Haemolysis, **407**
- of Tadla, Morocco, **407**
- Venom, Pharmacological Studies, **405**
  - Rattlesnake, Collection of, **406**
  - of Viper, Oyster Shell as Antidote, **901**
  - Precipitating Action of, **902**
  - Changes in Blood and Plasma, due to, **902** *bis*
- Sphaerita Parasite of *E. coli*, **390**
- Spider(s) New, from Brazil, **403**
  - Poisoning, **401,** 895
  - Red-Backed, Bite of, **897** *bis*
  - of Tadla, Morocco, **407**
  - Venom, Study of, **402**
- Stegomyia, Hibernation in Georgia, **427**
  - *fasciata*, in Cyrenaica, **885**
    - Egg of, Action of Diastase on, **885**
- Sting Ray Injuries, 408
- Tabanid Breeding Grounds in Java, **889**
- Tabanidae of the Samoa Is., **890**
- Tick(s) of Asia Minor, **898**
  - of Belgian Congo, **501, 898**
  - of Cold Regions, **436**
  - in Ear, Treatment, **436**
    - in Bolivia and S. Africa, **437**
  - Emulsion in Experimental Transmission, **386**
  - *Ornithodorus* sp., S. America, **897**
- Tick-conveyed Disease, Transmission Experiments, **386**
- Titles of Unnoticed Papers, 409-10, 440, 903
- Toad, Action of Venom, on Muscle, **408**
  - Flesh, Poisoning by, **408**
- *Trichomonas hominis*, Anaemia, **392**
  - Cultivation on Boeck Medium, **392**
    - Purification of, **393**
  - Detection by Cultivation, **385, 391**
  - Fed to Rats, **868**
  - Pathogenicity of Species, **868**
  - Pulmonalis in Putrid Bronchitis, **869**
- Trichomoniasis in Kittens, **393**
  - Vesical in Peru, **392**
- *Trypanosoma lewisi*, Variability, **395**
  - in Bologna Rats, 872
  - *minasense* in Monkey, **390**
- Trypanosomiasis and Host Resistance, **867**
- Tsetse in Anglo-Egyptian Sudan, **893**
  - Control in Tanganyika, **892**
  - Investigation, Nigeria, **433, 891**
  - in the Katanga, **501**
  - in Zululand, Tree Felling Experiments, **892**
- Venoms, Animal, and their Biology, **902**
  - of Scorpion and Viper, Immunity to, of Sloughi Dog, **406**
- ***Waskia***, Generic Name, **396**
  - ***intestinalis***, Human Infection, Brazil, **396**

**MISCELLANEOUS,** 52–73, 150–60, 232–47, 487–96, 670–80, 822–56
- Abscess, Splenic
  - Incidence
    - Southern Nigeria, 159
    - Usumbura, **154**
- Afro-American Therapeutics, **58**
- Alcoholism in Ruanda-Urundi, 55

**Miscellaneous**—*cont.*
- Anaemia
  - Addisonian, and Sprue, *see under* **SPRUE**
  - Infectious, of Rats, Chemotherapeutic Studies on, **831**
  - Pernicious
    - in Negro: U.S.A., **155**
    - Secondary: Calcutta, 65, **65**
    - and Sprue, *see under* **SPRUE**
  - Sickle-cell
    - Incidence
      - Sudan, **66**
      - U.S.A., **66, 670**
  - Splenic, in Filipinos, **678**
- Anaphylaxis after Injection of a Gramme of Quinine Hydrochloride, **679**
- Anthrax (Malignant Pustule) in Man; Treatment, 72
- Appendicitis: Nigeria, 159
- Bacteriological References
  - Bacillus of
    - Ducrey: Isolation of, **245**
    - Pfeiffer and of Weeks, and Acid. Agglutination, **245**
    - Weeks, **244, 245**
  - Bacteria, Plants and Vertebrates, Virus Diseases of, **247**
- Black Death, *see under* **Plague**
- Black Tongue, Hairy: Parasitology: Pathogeny, **151, 152**
- Blood
  - Blood Counts in
    - Honduras Labourers, Variations in, 233
    - Mississippi, **158**
  - Blood Exam., Anthropological, among Various Races, Malaya, **848**
  - Blood Fibrin and Levulose Tolerance in Acute and Chronic Tetrachloride Intoxication, **674**
  - Blood Groups of North Queensland Aborigines, with Statistics for Various Races, **671**
  - Blood Serum in Normal and Pathologic Conditions, Spectophotometric Analysis of, **848**
  - Blood Smears, Acetone Methylene Blue-Methylene Azur Eosin Solution for Staining, **671**
  - Blood-Sugar in Indians, Young, Normal Renal Threshold for, **232**
  - Chemical Composition of, in Inhabitants of the Tropics, **495**
  - Haemoglobin and Iron Content of that of Men Resident in the Tropics, **855**
  - Haemoglobin Values, Expression of, Improved Mode of (*with tables*), **494**
  - Haematology, Books on, **248, 774**
  - Human, Blood Picture of, in Mexican Highlands, **496**
    - in Caracas, **496**
  - Iron Percentage of, and of Viscera, of Natives, D.E.I., **490**
  - Leukaemia
    - Cancrum Oris in: Lagos, **157**
    - Lymphatic, in Javanese Woman, **156**
  - Rapid Stain for, **672**
- Broncho-pulmonary Affections: Ruanda-Urundi, 55

**Miscellaneous**—*cont.*
  Cardiac Diseases, Ruanda-Urundi, 55
  Catgut Sterilisation by Aniline Colours, **850**
  Cerebrospinal Fluid, Examination of: Sumatra, **239**
  Chemotherapy
    *Chlorocodon whiteii*, Constituents of, Pharmacological Action of, **247**
    Digitalis
      Indian, **234**
      Preparations of, in the Tropics
        Biological Assay of, **234**
        Potency-Variations in, **235**
  Colitis
    Treatment by
      Protein Shock, 53
      Yatren, 54
  Countries and Places referred to, Diseases, *&c.*, Prevalent in
    Abyssinia, Western
      Elephantiasis of Scrotum and Penis, Operation for, **824**
    Africa
      Trans-Jubaland Diseases of, **841**
      Tropical
        Lumbo: Disease of Natives, **833, 834**
      West: Liver Cirrhosis in, 158
      Zululand
        Witch Doctors and Healers, Native, **233**
    America, South, Pathology of, **58**
      U.S.
          Afro-American Therapeutics, **58**
          Negroes of, Pernicious Anaemia in, **155**
          Teaching of Tropical Medicine to Medical Students in, **53**
        Minnesota
          Histoplasmosis in a German Woman, **68**
        Mississippi
          Blood Counts in, **158**
    Anglo-Egyptian Sudan
      Khartoum: Kitchener School of Medicine. First Report, **54**
    Argelia and Tunis, Medical Mementos of, **855**
    Argentina
        Scientific Mission to, Report on, **58**
      Buenos Aires, *Rhinosporidium seeberi* in, **834**
    Asia, East, Goitre Distribution in, **247**
    Australia: Tick Paralysis in, **489**
      Brisbane, Tetanus at: Serum Treatment, **61**
    Brazil
        Diseases Prevalent
          Mal de Engasgo: Surgical Treatment, **830**
          Smallpox: Treatment by Xylol, **61**
          Syphitic Hepatitis with Ascites and Malarial Splenomegaly, **834**
          Ulceration, Chronic, of Vulva, **833**
      Ceará, Northern Districts, Diseases Prevalent, **57**
    China
        Past and Present Opportunities of, in Tropical Medicine, **844**
      Macao, Epidemiology of, **843**

**Miscellaneous**—*cont.*
  Countries, &c.—*cont.*
    Columbia, West Coast of, Medicine on, **56**
    Congo, Belgian
        Railway Construction in, Utilization of Native Labour: Medical Considerations, **842**
      Katanga
        Poisoning by Native Medicines, **247**
        Ulcero-membranous Stomatitis in, after Bismuth Treatment, **236**
      Stanleyville, Tetanus at, **61**
    Costa Rica: Diseases Prevalent, **57**
    Dutch East Indies
      Iron Percentage of Blood and Viscera of Natives, **490**
      Rheumatic Affections of the Heart in, **70**
      Ecuador, Pathology of, **840**
    Egypt
      Ancient: Mummies of, Pathology of, **850**
      Diseases Prevalent
        Cystitis caused by Mixed Infestation by *Amoeba histolytica* and *Schistosoma mansoni*, **70**
        Herpes and Measles Conjointly, in, **247**
    French Indo-China
      Annam Swelling in, **62**
        Pathogenesis of, **64**
    Gold Coast
      Aneurism, Aortic; Unusual Case in, **833**
    Greece
      Messenia Dept., Epidemiological Notes on, **846**
    Haiti: Oedema in Children, **829**
    India
        Digitalis of, **234**
        Diseases Prevalent, 52, **156, 677**
        Indian Medical Year (1925), **52**
        Medical Profession and Medical Research in, Present Position of, **53**
        Mushroom Poisoning Cases, **247**
        Tuberculosis in, Sanocrysin Treatment for Indians, **492**
      Bengal
          Blood-Sugar in Indians, Researches on, **232**
          Diseases Prevalent, **155, 156**
          Enteric Fevers and their Diagnosis **155**
          Epidemic Dropsy, **66**
            and Secondary Pernicious Anaemia, **65, 66**
          Funiculitis, Endemic, **247**
        Calcutta
          Address by Director of School of Trop. Med., **839**
          All-India Conference of Med. Research Workers at (1925), **838**
          Ear, Nose and Throat Diseases among Students, **247**
      Himalayas, Medicinal Plants of, **233**

**Miscellaneous**—*cont.*
  Countries, &c.—*cont.*
    Italy
      School of Clinical Pathology and Colonial Hygiene in, Need for, **855**
    Corsica
      Malaria and Tuberculosis in, 69
    Kashmir, Osteomalacia in, **70**
    Kenya
      Fort Hall Native Reserve, Medical Work in, **841**
    Malaya
      Blood Exam. in Various Races in, **848**
      Weights of Organs in Malays, **850**
    Nigeria: Clinical Records, **158**
    Panama
      Diseases Prevalent, 232
      Treatment by Mercurcurochrome and Neosalvarsan, Intravenous, **232**
    Philippine Islands
      Diseases Prevalent
        Analysis of, **847**
        Hill Diarrhoea, **831**
    Ruanda-Urundi
      Diseases Prevalent, 55-6
        Class Incidence, 55-6
      Hygienic Situation, 55
    St. Croix Island, Diseases Prevalent, **150**
    S. Domingo
      San Antonio Hospital, Cases from, **855**
    Senegal
      Dakar, Tetanus at, Atropine Sulphate and Serotherapy for, **61**
    Siam: Diseases Prevalent, **849**
    Tripoli
      Diseases Prevalent
        Furunculosis Treated by Autotherapy, **835**
        Phagedaenic Symbiosis of Vincent and Le Dantec in, 827
    Tropics: Neurasthenia in, **822, 823, 824**
  Tropical Hydrocele, Cholesterol in, Significance of, **150**
  Tropical Liver, 69
  Cure, Testing of a, Principles in, **852**
  Cystitis caused by *Amoeba histolytica* and *Schistosoma mansoni* in an Egyptian Boy, **70**
  Danysz Virus
    Transmission by, of Epidemic to Field Mice, Conditions of, **242**
    Virulence of, Maintenance of, for Four Years, in Rabbits' Blood, **242**
  *Dermacentor andersoni*, Filter-passing Virus from, **246**
  Diagnosis
    Serum, without Laboratory, **241**
    of Tropical Diseases, Serum Reactions in, **239**
  Disease, Causation of, Symbiosis in, Importance of, **157, 240**
  Elephantiasis of Scrotum, Penis, and Vulva, **824, 825**
    at Tangier, 163
  Epidemic Dropsy in India, **66**
    with Secondary Pernicious Anaemia, **65**

**Miscellaneous**—*cont.*
  Formol-Gel Reaction, Supplementary Note on, **678**
  Gangrene, Gaseous, in Wounded, on Moroccan Front, **72**
  Gaté, Papacostas and Allied Reactions, Diagnostic Value of, **677**
  Granuloma, Perianal, Ulcerous, Due(?) to Chlamydozoa, **150**
  Granulomata and Granuloma-like Conditions, Infective Diseases Included as, **67**
  Haemoglobinometer, Graduated for Weight of Haemoglobin, **246**
  Hearing Region, Peripheral, Pathological Changes in, due to Malarial Remedies, **828**
  Hernia: West Africa, 158
  Hydrocele, Tropical, Cholesterol in, Significance of, **150**
  Immunization
    Local, of Guineapigs, with *Pasteurella* of Wild Rats, **243**
    Oral, **241**
  Immunity, Acquired, of Silkworms, **679**
  Infections Simultaneously Transferred, Course of, **152**
  Insulin, Preservation of, **233**
  Intestinal Parasitism and Tuberculosis (*q.v.*), **68**
  Laboratory Animal, Pathology of, **241**
  Lathyrism in Gilgit Agency, **676**
  Leyden Inst. of Trop. Med., **835**
  Liver
    Temperature of, Effect on, Immediate, as Result of Lowering Intragastric Temperature with Ice-Water, **847**
    Toxic Effects on, of $CCl_4$: Treatment, **235**
    Tropical, **69**
  Liver Abscess, Streptococcal, in a Boy of 11, **493**
  Liver Cirrhosis
    Infantile: India, **156**
      Causation: Treatment, **677**
    in W. Africa, 158
  Mal do Bicho, Portuguese Accounts of, 16th Century, **330**
  Mal de Engasgo: Surgical Treatment, **830**
  Measles
    Complicated by Amoebic Dysentery in Convalescence: Alexandria, **154**
    in Costa Rica, 58
  Medical Notes, made during the Voyage of the *Bellatrix* in the Indian Ocean, **56**
  Medical Periodicals from the Library Standpoint, **854**
  Medicinal Plants Discovered by Renaissance Portuguese, **329**
  Meningococcus Septicaemia of Pseudo-Malarial Type, without Meningitis: Coblenz, **157**
    Simulating Malaria, Recovery after Turpentine Abscess, **247**
  Night-blindness: Mozambique, 330
  Physiology, Comparative, and Comparative Pathology, **849**
  Pig's Bristle Disease, **157**

**Miscellaneous**—*cont.*
Plaster-of-Paris, Cheap Waterproof Substitute for, in Outpost Dispensaries, **677**
Poisons and Poisoning
  Arsenic, Bismuth, and Mercury, Antidote to, **247**
  Carbon Tetrachloride, Acute and Chronic, Blood Fibrin and Levulose Toleration in, **674**
  Castor-Oil Seeds, **237**
  *Clitoria ternatea*: Recovery, **238**
  Katakar Oil, **238**
  *Lathyrus sativus*, **676**
  Lupine: Fatal Case, **238**
  Mushroom
    France, **75**
    India, **247**
  Native Medicines: Katanga, **247**
  Opium, Acute: China: Hypertonic Saline Injections in Treatment of, **829**
  Poison Animals and their Poisons, Book on, **327**
  Snake-poisoning, Portuguese knowledge on, 16th Century, **330**
  Stovarsol, **672**
Protozoiasis in Temperate Zone Residents and Associated Digestive Malfunction, **150**
Scarlet Fever: Costa Rica, 58
Septicaemias, Haemorrhagic, Organisms of, Differentiation of, **243**
Silkworms, Immunity, Acquired, in, **679**
Soft Chancre and Bubo, Treatment, Specific, Vaccines for, Polyvalent and Monovalent, **488**
Spirillo-Bacillary Symbiosis, **826**, **827**
  Phagedaena due to, **827**
Splenectomy: West Africa, 158
Stains and Staining Methods
  for Blood and Blood Smears
    Acetone Methylene Blue-Methylene Azur Eosin Solution, **671**
  Rapid, **672**
Sterilization of Catgut, by Aniline Colours, **850**
Sugars and other Carbon Compounds, a Mycological Method to Identify, **677**
Sweat-Glands, Apocrine, in Whites and Negroes, **159**
Sweating, Normal and Pathological, **232**
Symbiosis in Causation of Disease, **157**, **240**
Tetanus
  Incidence
    Australia: Brisbane, **61**
    Belgian Congo: Stanleyville, **61**
    Nigeria, 159
  Treatment by
    Atropine Sulphate, **61**
    Serotherapy, **61** *bis*
Tetanus neonatorum, Treatment by Magnesium Sulphate, **493**
Tick Paralysis; Australia, **489**
Titles of Unnoticed Papers, 73, 679–80, 856
Treatment by
  Amino-Stiburea; Anaphylactic Reaction after, **237**

**Miscellaneous**—*cont.*
Treatment by—*cont.*
  Antimony Compounds Pentavalent, Reactions after, **672**
  Arsinic Acids, Aromatic: Action of, in relation to Constitution, **674**
  Bismuth Injection, Death due to, **236**
  Carbon Tetrachloride, Intoxication from, Blood Fibrin and Levulose Toleration in, **674**
    Liver Cirrhosis, Early, in Dogs, due to, **235**
    Toxic Effects on Liver, Treatment by Sugar, &c., **235**
  Mercurochrome and Neo-salvarsan, **232**
  Stibenyl and Stovarsol, for Tropical Diseases, **852** *bis*
  Treparsol, Death due to, **236**
  Urea-Stibamine: Unusual Sequelae, **237**
Tropical Disease(s)
    Clinical Medicine in, Research on, **53**
    Diagnosis of, Serum Reactions in, **239**
  Lacunae, **839**
  Liver, **69**
  Medicine: Teaching of, to U.S.A. Medical Students, **53**
Tularaemia; Transmission by Ticks, 246
Ulcerations, Ulcers
  Phagedaena due to Spiro-Bacillary Symbiosis, **827**
  Phagedenic, of Genitals, Treatment by Intravenous Antimony and Pot. Tartrate, **316**
  Rectal, and Rectal Stenosis, **151**
Vincent's Angina, Organisms in, Biology of, **826**
Virus Diseases of Bacteria, Plants, and Vertebrates, **247**

**MYCOLOGY** (*see also* **DERMATOLOGY, TROPICAL**), 318–23
DISEASES
  Actinomycosis of Lung [China], **321**
  Blastomycosis of
    Bladder, **323**
    Internal Organs [D.E.I.], **322**
  Book on, **74**
  Bronchomycosis, Case of, **319**
  Granuloma, Coccidiodal [California], **322**
  Macroglossia Mycotica [Brazil], **320**
  Mycetoma pedis, Reference to in Cuneiform Scripts, **348**
  Mycoses in the Urundi District, **318**
    Pulmonary, **318**
  Pneumomycoses, Principal, 319
  Tonsillomycoses, **319**
FUNGI
  Actinomyces, Biology of, **321**
  Monilia, Relation of, to Infections of the Upper Air Passages, **319**
    Same Species Present in Different Mouth Lesions, **320**

**OPHTHALMOLOGY, TROPICAL,** 472–82, 1011–21
Amblyopia, Stibamine-Caused, **1018**
Asthenopia, in R.A.F. Pilots, **1019**
Atropine Irritation, 481–2

**Ophthamology, Tropical**—*cont.*
  Blenorrhoea neonatorum, 472
    Treatment by Blaizot's Antigonococcal Serum, **1014**
  Blindness, in Atchin : Causes, **1019**
    Night, in R.A.F. Pilots, 1019
    Book on, **160**
  Cataract
    Incidence
      Egypt, 1020
      India
        Madras, 1017, 1019
        Punjab, 1017
        Shikapur, 1015
    Lamellar
      Rare in Southern India, 1019
      Rickets associated with, 1020
    Operations for
      Barraquer's Phakoerisis, **1017** *bis*
      Couching : Indian Preliminary Methods, **478**
      Conjunctival Suture, Untied, and Conjunctival Bridge in, **477**
      Extraction
        Hints on, for Beginners, **479**
        Intracapsular Methods
          Banaji's and Smith's, **479**
          Most Recent, **1017**
        with Iridectomy, 1020
        Iris in, Treatment of, **479**
        Prolonged Preparation for, Deprecated, 478
        in Secondary Cases, Opening by Single, Straight Incision, **480**
        in Senile Cases, Hints on, **479**
      Facial Nerve to be Blocked during, **1016**
      Globe Control during, **1016**
      Trephining ; Madras, 1020
    Senile : Operation for, **479**
      in Egypt, 1020
      and Juvenile, Madras, 1019
    Sequelae, **1015**, 1020
      Iritis, **479**
      Post-operative Infection, Avoidance of, **479**
      Purulent Wound-Infection, Iodine, Intravenous, for, **479**
  Conjunctiva, Affections of
    Calcium Deficiency causing, **1011**
    Catarrh, Spring, **1011**
    Conjunctival Inflammations of Man, and Animals, *see also* Trachoma *infra*
      Prevention and Treatment of, by Besredka's Bouillon Vaccine, **482**
      Taboury's Classification of, **472**
    Conjunctivitis
      Diphtheroid : Treatment, **1011**
      Forms seen at Jassy, **1013**
      Granular, of Laboratory Animals : Importance of, for Study of Trachoma, **244**
      Koch-Weeks, in
        Madras, 1019
        Rumania, 1013
      Membranous : Egypt, **472**

**Ophthalmology, Tropical**—*cont.*
  Conjunctiva, Affections of—*cont.*
    Conjunctivitis—*cont.*
      Natural, in Rabbits, Conjunctival Inflammation Granular, in Man Produced by Inoculation of, **1013**
      Phlyctenular : Madras, 1019
      Swimming-bath, 472
    Myopia, Malignant, **1011**
    Rhinosporidial Polypus : X.-Ray Treatment Unsuccessful, 1020
  Cornea
    Lead Opacity of, Treated by Solution of Sulphuretted Hydrogen, **477**
    Leukomata of : Atchin, 1019
    Lime-burning of, Treatment by Neutral Ammonium Tartrate, **477**
    Wounds of
      Double Triangular Conjunctival Flap to Cover, **476**
      with Prolapsed Iris, Surgical Treatment of, **476**
  Cyclitis Artefacta, *see* Uvea, *infra*
  Drug Idiosyncracy and, **481**
  Eye-diseases
    in Ambon, D.E.I., **474** *bis*
    Pepsin in, **475**
  Eyelids
    Destructive Lesions of Tarsorrhaphy for, **472**
    Fixation of, by Thread Method, in Tarsus Operation, **475**
  Glare, Effects of, in R.A.F. Pilots, **1019**
  Glaucoma, in Egypt, 1020
    due to Prolonged Application of Cold on Eye, **480**
    Treatment
      Medicinal, Prolonged, Inadvisable, **478**
      Trephining, 1020
  Iridocyclitis from Drop of Smallpox Vaccine, **1019** *bis*
  Iridotomy, by Single Straight Incision, **480**
  Iritis after Cataract Extraction, **479**
  Keratitis
    Parenchymatous, after Infection with Trypanosomiasis, **1018**
    Superficial, in Malaria, 480
  Keratomalacia : Madras, 1019
  Lens
    Nutrition of, Experiments on, **1015**
    Opacity of, in Kala Azar Patient, recovered, **1018**
  Malarial Eye-affections, **480**
  Mucous Membrane Grafting : Egypt, 1020
  Myiasis, with Chronic Degeneration of Cornea, **1018**
  Night Blindness in R.A.F. Pilots, **1019**
  Ocular Affections of Egyptian School-children, 1020
  Ocular Complications in
    Amoebiasis, **481**
    Ankylostomiasis, **481**
    Kala Azar, **1018**
    Leprosy, **481**
    Malaria, **480**, 1018
    Myiasis, 1018
    Small-pox, **480**
    Trypanosomiasis, Canine, **1018**

**Ophthalmology, Tropical**—*cont.*
- Ocular Diseases in
  - Egypt, **1020** *bis*
  - French Colonies, **160**
  - Madras Ophthalmic Hospital, 1019
- Ophthalmia
  - Gonorrhoeal, 1020
    - Attack of, Pannus Cured by, **1014**
    - Treatment by Blaizot's Antigonococcal Serum, **1014**
  - Koch-Weeks
    - Egypt, 1020
    - Sfax; with Purulent Forms, **476**
- Ophthalmic Work
  - " Don'ts " in, **478**
  - Notes on, **479**
- Ophthalmomyiasis, Subretinal: Holland, **482**
- Neuritis, Optic, presumably due to *Ancylostoma duodenale*, **481**
- Refraction, Errors of: Madras, 1020
- Retinal Haemorrhages, in Malaria, 480
- Retro-bulbar Alcohol Injection in relief of Pain in a Blind Eye, **481**
- Review of Recent Articles, **472, 1011**
- Trachoma
  - Agent of, **472**
  - Campaigns against, in
    - Palestine, **473** *bis*
    - Tunis: Sfax, **476**
  - Cicatricial, Hyperplastic Growths in Eyes affected with, **476**
  - Diagnosis
    - Difficulty of, **474**
    - Early, **472**
  - Hypertrophic and Neo-plastic Growths in, **476**
  - Incidence
    - Geographical
      - Argentina
        - Buenos Aires District, **1012** *bis*
        - Tucuman Province, **1012**
      - Dutch East Indies
        - Ambon, **474** *bis*
        - Atchin, **1019**
      - Egypt, Work on, of MacCallan, **476**
      - Finland, **473**
      - France: Marseilles
        - Anti-trachoma Centre for, Urged, **476**
      - French Cameroons, **1011**
      - Greece, **1011**
      - Palestine
        - Epidemiology, Prophylaxis, and Treatment, **473**
        - Jewish Campaign against, **473**
      - Roumania (Jassy), **1013**
        - Symptoms, Stages, and Secondary Infections, **476**
      - Russia, **1012** *bis*
      - Tunis: Sfax, **476**
      - Uganda, 482
      - U.S.A.
        - New Mexico, **1013**
        - South-West, **1012**
      - Uruguay, **1012**
    - Racial, **1011**
      - North American Indians, **1012, 1013**
  - Micro-organism Isolated from, by Noguchi, **1013**

**Ophthalmology, Tropical**—*cont.*
- Trachoma—*cont.*
  - Origin of, Nicolle on, **1013**
  - Pannus of
    - Cure of, by Gonorrhoeal Ophthalmia, **1014**
    - Protecting in Case of Burning by Caustic Soda, **1015**
  - Pigment Changes in Conjunctiva of Lids in, **474**
  - Prophylaxis, suggested, **1011**
  - Study of, Importance for, of Granular Conjunctivitis of Laboratory Animals, **244**
  - Treatment, **474**
    - Various Methods
      - Acetic Acid, **1014**
      - Anti-gonococcal Serum, Blaizot's, **1014**
      - Chaulmoogra Oil, **1014** *ter*
      - Serotherapy, **475**
    - Warning on, 478
  - Trichiasis and Entropion of, Snellen's Operation for, 1020
  - Unilateral, in Corsican Girl, **476**
- Urine as Eye-lotion, 1014
- Uvea: Treatment by Grains de Val, **1015**
- Vitreous Humour, *Cysticercus* in: Brazil, **482**

**OROYA FEVER AND VERRUGA PERUANA,** 120–2, 622–4
- Carrion's Disease, **624**
- Oroya Fever
  - *Bartonella bacilliformis*
    - Behaviour of, in Apes, Anthropoid and other, **121** *bis*
      - Skin Response of these Animals to Inoculation therewith, **622**
    - Distribution of, in Tissues, **622**
    - Pathological Changes in Animals Experimentally Infected with, **622**
    - Transmission of, Experimental, by Ticks, **121**
    - Viability of, in Cultures, and in Preserved Blood and excised Nodule of *Macacus rhesus*, **120**
  - Cross-Immunity between, and Verruga Peruana, Experiments on, **623**
  - Etiology of, **120, 121, 622, 623**
  - Van den Bergh's Reaction, Haemagglutinins, and Haemolysins in, **122**
- Verruga Peruana
  - Cross-Immunity between, and Oroya Fever, Experiments on, **623**
  - Etiology, **623**

**PELLAGRA,** 286–95, 805–11
- Acrodynia, Infantile, in relation to, **809**
- Biology of, **291**
- Blood in
  - Changes in
    - Morphological, **292**
    - Study of, **293**

**Pellagra**—*cont.*
- Case Reports, **289** *bis*
- Dermatitis, Fusospirillary, in, **808**
- Diet-Toxins in Relation to, **294, 295**
- Etiology, **288, 808**
  - Dietary Factor in, **290** *bis*
  - Maize " White Mould " Theory of, **291**
  - Present State of Knowledge of, **290**
- Experimental, 291
- Hydrochloric Acid, Gastric, in, **292**
- Incidence
  - Age, **289**
  - in Animals and Man, **810**
  - Geographical
    - Austria, Post-War, Sporadic, **289**
    - China : Honan, **805**
    - Japan, **286**
    - Korea, 805
    - Malaya, **288**
    - Nyasaland, **287** *bis*
    - Spain, Centre of, in Calda de Reyes, Pontevedra, **288**
    - Scotland, **289**
    - U.S.A., **286**
      - District of Columbia, 290
      - Georgia, 811
- Maize and, 288, 294, **295**
  - " White Mould " of, in relation to, **291**
- Prophylaxis, Dietetic
  - Dietary Factor in, **290**
  - Pellagra-Preventive Action of Tomato, Carrot, and Rutabaga Turnip, **811**
- Symptoms, **291**
- Treatment, **288**
  - Yeast in, **290**

**PLAGUE,** 32–40, 453–59, 929–40
- Abortive or Ambulatory, Differentiation of, from Lymphogranuloma, **934**
- Bacteriological Research Work in South Africa, **37**
- Bacteriology
  - *Bacillus pestis*
    - and *B. pseudo-tuberculosis rodentium* on Carbohydrate Media, Differentiation of, **939, 940**
    - Boiled, as Antigen, **39**
    - Culture of, Nutrient Broth now used for, and its Hydrogen-ion Concentration, **939**
    - Discovery of, **341**
    - Filterable Forms, **458**
    - Man as Carrier of, **34**
      - Healthy, **933**
    - Persistence of, in Glands, after Recovery, **934**
    - Strain of, for Preparation of a Vaccine, Selection of, **938**
    - Two Variants of, **457**
    - Virulence of, in Media, with and without Chloride of Sodium, **940**
    - Vitality of, in Stained Smears, **38**
- Black Death, The, **338, 339**
- Books on, **502, 772**
- Diagnosis, Rapid Method of, **456**
  - Differential, of Abortive form, from Lymphogranuloma, **934**

**Plague**—*cont.*
- Epidemiological Research, Modern Trends of, **34**
- Fleas, Rat, Species, Bionomics and Biting Powers of, Connexion of, with Occurrence of, 453
  - as Reservoirs of, **936, 937**
  - of Rodents, N.W. Cape Province, 454
- HUMAN
  - BUBONIC
    - Incidence
      - Argentina : Buenos Aires, 35
      - Ceylon : Colombo, 453
      - England : Liverpool, 935
    - Secondary Broncho-Pneumonia in, **35**
    - Spread of, Chief factors of, 453
    - Treatment
      - Iodine
        - Colloidal, **36**
        - Intravenous, **36**
  - Epidemiology : Problems of, in Astrakhan, **32** *bis*
  - Carriers, Healthy, **933**
  - Incidence, All forms, or more than one form
    - Army of the East of the First French Republic, **337**
    - Geographical
      - Athens(?), 430 B.C., 335 *sqq*
    - Australia, 1900–25, History of, **929**
    - Britain : Old-Time, **334**
      - Ceylon : Colombo, 931, 932
      - Japan, **933**
      - Madagascar, 56
        - Diego-Suarez, **454**
      - Nigeria : Lagos, **35**
      - Past and Present, **335**
      - Russia or U.S.S.R.
        - Astrakhan, **32**
        - Buzashi, **935**
        - New Focus of, **935**
        - Saratov, 35
        - Siberia, **34**
        - S.E., Endemic, **455**
        - Transbaikalia, **34** *ter*
          - Endemic Foci of, **934**
        - Transcaspia, **936**
        - Turkestan, **936**
        - Volga Steppes, **33**
      - Senegal : Dakar, Carriers of, 34
      - South Africa, **37, 772**
        - Cape Province, N.W., **454**
  - Influence of, over the Sexual Sphere of Woman, **35**
  - PNEUMONIC
    - Book on, **502**
    - Incidence
      - India : British, **39**
      - Madagascar, 454, **455** *bis*, **934**
      - Manchuria, **934**
      - Russia = U.S.S.R.
        - Kirghiz Steppe, **32**
        - Uralsk Government, **32**
      - Senegal, 455
  - Preserved Organs from Cases, Thermo-precipitin Test in : Results, **39**
  - SEPTICAEMIC
    - Madagascar, 454, 455

- **Plague**—*cont.*
  - Human—*cont.*
    - Transmission of by
      - Fleas of Susliks and Jerboas, in the Volga Steppes, **33**
      - Rodents, 456, 457
    - Treatment
      - Bayer 205, **35**
      - Mercurochrome-220 Soluble, **455**
      - New, Suggested, **36**
  - Parasitology of, **453, 930**
  - Prophylaxis
    - Anti-plague Vaccines Sensitized, Toxicity and Immunizing Value of, **457**
    - Disinfection of Tarbagan Skins, **34** *quat.*
    - Gas and Poisoning of Susliks, U.S.S.R., **937** *ter*
    - Sterzing Plague Ordinance of 1534, **340**
  - Rats, Fleas, and, in Japan, **933**
  - Resolving, Late Bacteraemia and, Experimental in Rats, **457**
  - Rodent
    - Epizootics of, Winter Plague in Relation to, **936**
    - Incidence
      - N.W. Cape Province, S. Africa, 454
      - Russia, S.E., 455
    - Mice : Kirghiz Steppe, 32
      - in relation to Human Plague, in S.E. Russia, 32
    - Rats
      - Late Bacteraemia and Resolving Plague in, Experimentally Produced, **457**
      - Resolving, New Orleans, 34
      - Thermoprecipitin Reaction in, Value of, **456**
    - *Rhombomys opimus* in Asiatic U.S.S.R., **936**
    - Suslik Fleas, acting as Winter Reservoirs, **937**
    - Susliks in S.E. Russia, in relation to Season, **32** *bis*
      - and Jerboas, Fleas of, in relation to Spread of Plague in the Volga Steppes, **33**
    - Tarbagans in Transbaikalia, and the Disinfection of their Skins, **34** *quat.*
    - in Wild Animals, Practical Aspects of, **456**
  - Titles of Unnoticed Papers, 39–40, 459, 940
  - Transmission by
    - Fleas, **637,** 930 *sqq*
        - Inhabiting Spermophile Burrows, **936**
      - in Japan, **933**
      - *Xenopsylla astia* and *X. cheopis*, **932**
    - Gerbilles : Kirghiz Steppe, 32
    - Grain, 932
    - Human Carrier, **34**
      - Healthy, **933**
  - Winter : Relation of, to Epizootics in Rodents, **936**

- **Pneumonia and other Pneumococcic Infections**
    - Incidence
      - Panama, 233
      - South Africa, in Native Mine Workers, **487**

- **Pneumonia, &c.**—*cont.*
    - Treatment by
      - Sod. Nucleinate for Mine Natives, South Africa, **487**
      - Specific in, Rationale of, **487**
  - Lobar
    - Incidence
      - Colombia, 153
      - Honduras, **153**
      - Panama, **152**
    - Treatment by Mercurochrome, **152,** 153, 233
  - Pneumococcus, Therapy, Specific in, Rationale of, **487**

- **RABIES**, 222–31, 483–6, 760–70
  - Antirabic Service at l'Institut de Médecine expérimentale, Report on, for 1925, **766**
  - Animal, Japan : Results of Treatment, **768**
  - Bibliography, **770**
  - Bites on Terminal Phalanges, Gravity of, **770**
  - Blood in
    - Changes in, in Rabid Animals, **763**
    - Virulence of, **225**
  - Bovine
    - Treatment by Carbolized Vaccine, **769**
  - Canine
    - Consumptive, Question of, **762**
    - Leucocyte Formula in, during Treatment with Finzi's Mixed Hetero-homologous Vaccine, **763**
    - and Nervous Distemper, Differential Diagnosis, Difficulties in, **763**
    - Paralytic Accidents during Treatment, **766**
    - Post-Infectional, Immunization with Single Doses of Fresh Virus, **768**
    - Prophylaxis
      - for Buenos Aires, **769**
      - Control Measures, **226**
      - Immunization
        - by Lyssin, **768** *bis*
        - Other Methods, **227**
      - Tokio Statistics, **767**
      - Vaccination with Antirabic Vaccine, Percutaneously, **769**
          - Compulsory, **769**
        - Various Methods, **769**
    - Statistics, **767**
    - Treatment by
      - Mixed Vaccine, **227, 769**
      - Remlinger's Etherized Vaccine, **768**
      - Ultra-Violet Rays, **770**
  - Central Nervous System in, Changes in, **223, 224**
  - Cholesterine Variations during, **764**
  - Complement Deviation in, **225**
  - Cross-immunity between, and Variola, **231, 770**
  - Diagnosis, **762**
    - Differential, **763**
      - from " Rage imaginaire," **762**
  - Dispensaries, Subordinate, for Outlying Districts, Italy, **770**
  - Epidemiology (*see also* Incidence, *infra*), **225**
  - Epizootics of, **226** *bis*

**Rabies**—*cont.*
- EQUINE
  - Treatment by
    - Carbolized Virus, Failure of, **768**
    - Remlinger's Etherized Virus, **768**
- Experimental Studies on, **222**
- Fever in, Premonitory and Periodic, **223**
- Geographical Distribution (*see also* Incidence, *infra*), **760**
- Immunity in, Local, **225**
- HUMAN
  - Cerebrospinal Fluid in, **763**
  - Prevalence in U.S.A., **769**
  - Statistics, **766**
- Incidence in Animals and Man, *see also* CANINE, Epidemiology, & Geographical Distribution, *supra*
  - Argentina: Buenos Aires, **769**
  - Austria: Vienna, 231
  - Balkan States, **230**
  - Dutch East Indies: Java, 231, **767**
  - England, 226
  - Eritrea, **760**
  - France
    - Dijon, **226**
    - Lyons Region: Treatment, **766**
    - Statistics, **766**
  - Germany, **225, 226** *bis*, 231
  - Holland, 226
  - India, 229
    - Assam: Shillong, **230**
    - Coonoor, **230**
    - Bengal: Calcutta, **230**
    - Kassauli, **767**
  - Italy, **770**
  - Japan, **768**
  - Kenya; Moyale, **763**
  - Russian States, 229, 231, **766**
  - Spain: Madrid, **767**
  - Tangiers, **760,** 761
  - Tunis, **230, 766**
  - Union of South Africa, **760**
  - U.S. America, **769**
  - West Africa, 760
- Increase in, Great, Post-War, 226
- Incubation-period, Long, **223**
- Infectivity, Recurrent in, **223**
- International Rabies Conference, 483–6
  - Resolutions of, on
    - Anti-rabic Treatment, **483**
    - Nature of the Virus, **483**
    - Treatment, **483**
    - Vaccination of Animals, **485**
- Leucocyte Formula in Animals, **763**
- Misdiagnosed in Cat, **763**
- Monograph on, **770**
- Negri Bodies in Rabbit's Brain after Inoculation with Street Virus, **231**
- Nervous System, Central and Sympathetic, Changes in, during, **223, 224**
- Pasteur Institutes, Statistics of, **230** *quat.*, **766, 767**
- Pathogeny of, New Facts on, **764**
- Pathological Anatomy of, **223**
- Pathology, **763**
- Prophylaxis (*see also under* CANINE, *supra*), **769**
  - Antirabic Serum, Rabicidal Property of, **764**

**Rabies**—*cont.*
- Prophylaxis—*cont.*
  - Control Measures, **225, 769**
  - Experimental Studies on, **769**
  - Immunization
    - Experiments, **224** *bis*
    - Methods, **228**
    - Researches in Mice, **765**
  - New Facts on, **764**
  - Vaccination
    - Auto-vaccination, **227** *bis*
    - Cutaneous, **229** *bis*, **769**
    - Vaccines for
      - Carbolized, **228**
      - Etherized, **229**
      - Formolized, **227**
      - Mixed, **227**
      - Variola, Immunity Conferred by, **231, 770**
- Pseudo-, in Man, **223**
- Psychic Disturbances after Antirabic Treatment: " Rage Imaginaire," **762**
- in Rabbits, Cerebrospinal Fluid in, 764–5
- Rabicidal Substances in Nerve Cells; Experiments on: Results, **224**
- " Rage Imaginaire," **762**
- Researches on, **760**
- Review of Recent Articles, **222, 760**
- Serology, **223**
- Skin in, Rôle of, **226** *bis*
- Statistics of
  - Canine, **767**
  - Human, **766**
  - Treatment, **229**
- Sympathetic Ganglia in, Changes in, **224**
- Symptoms, **762**
- Transmission, Congenital, **223**
- Treatment
  - Accidents during
    - Anaphylactic, **230**
    - Paralytic, **230** *bis*, **231** *bis*, **766**
  - Statistics of, **229**
  - Various Methods, **765**
    - Arsenic and Antimony Compounds, **851**
    - Ether Virus, Rabicidal Activity and Persistence of, **228, 229**
    - Högyes Method, **767**
    - New, **766**
    - Pasteur Institutes
      - Kassauli, India, **767**
      - Tunis, **766**
  - Vaccine
    - Antirabic
      - Carbolized, **765**
        - and Högyes Method, Relative Efficiency, **767**
      - " 58–60 " of Hermann, **765**
      - Formolated, **766**
      - Intrarachidian, **765**
      - Local, **765**
        - Percutaneous, 229, **769**
      - and Serovaccination of Fermi, **770**
- Urology of, in Experimental Rabbits, **224**
- Vaccine, Antirabic, Preparation of, **766**
- Virus
  - in A.-E. Sudan, Nature of, **762**
  - Comparison with, of a Virus obtained by Kobayashi from Epidemic Encephalitis, **762**

**Rabies**—*cont.*
 Virus—*cont.*
   Complement Fixation, Specific of, by means of Cooked Antigens, **224**
   Cords used for Antirabic Vaccination
     Extraction of, by Oshida's Methods, **231**
     Virulence of, **761**
    Glycerinated
     Effect on, of Temperature, **762**
     Virulence-duration of, as affected by Temperature, **762**
   Distribution of, in Rabid Animals, **763**
   Influence on, of Ultra-Violet Rays, **222**
   Morphological Characters of, **760**
   Researches, Recent, on the Nature of, **760**
  Fixed
   Action on, of Ether, **229**
   Algerian, Immunizing Power of, Long Retention of, **222**
   Attenuation of, in Inoculation, Intracorneal, **761**
   Cords of, Attenuated, Strength of, Maintenance of, **765**
   Negri Bodies and, **761**
   of Odessa, Biological Properties of, **222**
   Passage of, in the Nervous System during Antirabic Treatment, **764**
   of Smolensk, Virulence-duration of, **222**
   Virulence of, **761** *bis*
  Paris Strain, Virulence-duration of, **222**
  Street
   Cochin China, Conservation of, **762**
   Tangier, **760,** 761
 VULPINE: Dijon, **226**
 With Animal Experimentation, **231**

**RAT-BITE FEVER,** 92–5, 702–3
 Bacteriological and Experimental Observations on, **93** *bis*
 Causal Organisms
  *Spirillum minus* var. *morsus muris* = *Spirochaeta morsus muris*
   Demonstration of, **702**
   in Rats, Batavia and Amsterdam, **94** *bis*, **702**
 Incidence
  Australia, Probable, 95
  Brazil, **703**
  British Guiana, due to Cat-Bite, **703**
  China, **702**
  Dutch East Indies, Batavia, **94** *bis*, **702**
  Holland, **94** *bis*
  Japan, 702
  New Caledonia, in Child, 80
  Scotland : Edinburgh, **93** *bis*
  Sicily, **703** *bis*
  Somalia, **703**
  U.S.A., in Infant ; Clinical Report, **93**
 Reinoculation of, in Rabbits, **94**
 Septicaemia, Filterable Virus, following Rat-Bite, **95**
 Title of Unnoticed Paper, 95
 Use of, in Treatment of G.P.I. (*q.v. under* **YAWS AND SYPHILIS**), **92**

**RELAPSING FEVER AND OTHER SPIROCHAETOSES,** 77–91, 685–701
 Colombian, Simulating Acute Appendicitis, **688**
 Coma, Apoplectic in, **688**
 Epidemiology: Rôle in, of the Bug, **685**
 EXPERIMENTAL
  in Birds
   Immunity in, Duration of, **701**
  in Mice
   Action in, of Sanocrysin, **86**
   Immunity Reaction, New, in, **690** *bis*
   Rieckenberg Reaction in, **82**
   Sterilizing Action on, of Salvarsan, **84, 85**
   Treatment by Albert 102, **689**
  in Rabbits, **81**
   Reputed-Immune, **82**
  in Rats
   Behaviour in Skin, of Spirochaetes, **83**
   Serum Albumin in, **83**
  Spirochaetes in
   Persistence of, **84**
   Relation of, to the Tissues, **691**
 HUMAN, Blood Culture and Serological Researches in, **693** *bis*
 Immunity Period, Antagonism in, of Parasitic Infections, **81, 694** *ter*
 Incidence
  A.-E. Sudan, **687**
  Argentina, Northern: Jujuy, **91**
  Asia, Central, **80**
  Belgian Congo : Katanga, 236
  Colombia, 57
   with Appendicitic Symptoms, **688**
  Dakar, during a Dengue Epidemic, **688**
  Nigeria, Northern, **79**
  Ruanda-Urundi, 37
  Russia, 685
  Somaliland: Oadweina, **687**
  Spain, 77, 78
   Toledo Province, **80**
  Tunis, 77, 78
  Wadai (Ouadaï), 688
 Inoculation with, in G.P.I., Simultaneously with Malaria: Course of the Two Infections, **152**
 and Nagana : Reciprocal Influence of, **81, 694** *ter*
 Relapse, Superinfection and Re-infection, Provoked, in, **690**
 Reticulo-Endothelial System, Blocking of, in, **691**
 OTHER SPIROCHAETOSES
  BRONCHO-SPIROCHAETOSIS, **88**
   in an Argentino, **698**
   Chronic, with Acute Exacerbation, **697**
   General Infection and Treatment, **90**
   Geographical Distribution, **91**
   [with Haemoptysis], **698**
   Incidence
    China
     Kiangsu, &c., **696**
     Lower Yangtse River, **91**
    India, **91**
    Nigeria, Northern, **90**
    U.S.A., New York State, Analysis of Cases, **695** *bis*

**Relapsing Fever**—*cont.*
- OTHER SPIROCHAETOSES—*cont.*
  - BRONCHO-SPIROCHAETOSES—*cont.*
    - Is it a Distinct Clinical Entity ? **697**
    - Parasitological Study of 32 Cases, **696** *bis*
    - in Persons Wounded on Thorax by Projectiles, **697**
    - Researches on, **698**
    - Skin Eruption with, **698**
    - Treatment by Arsphenamine, 698
  - Dermal, Granulomatous, 78–9
  - Spirochaetal Infections
    - of Man, **78**
    - with Necrosis and Ileum Perforation, **700**
    - of White Mice, and Mixed Trypanosome-Spirochaete Infection, **691**, *c.f.* **86**
- Persian, in Central Asia, **80**
- Spirochaetes (Leptospira, Spirilla, Spirillaceae, Spironema), associated with
    - Action on, of Salvarsan, 84, **84**, **85**
    - Behaviour of, in Skin, **83**
    - Faecal and Bronchial, Curves and Coefficients of, **88** *bis*
    - Caecal, **698** *bis*
    - Diarrhoea, Dysenteric, Provoked by, **699**
    - in Experimental Cases, Relation of, to Tissues, **691**
    - Identification of, Morphological Index of, **711** *bis*
    - One of White Mouse, Pathogenic to Man, **86**
    - Pseudo-spirochaetes and Flagella, **700**
    - Salvarsan for, Sterilizing Capacity of, **689**
    - Salvarsan Susceptibility of, **689**
    - Significance of, for Parasitological Discovery, **695**
    - Staining of
      - Fontana-Tribondeau Method, Modification of, **700**
      - Hollande's Method, **700**
  - Leptospira
    - Free-Living Forms : New Habitat, **87**
    - Modes of Examination of, **87**
  - Spirochaeta
    - *carteri* (Spironema) Serological Mutation in, **694**
    - *crociduraе* of the Shrew
      - Cultivation of, **87**
      - Pathogenic to Man, **87**
    - *duttoni* in Brain of General Paralytic, during Relapsing Fever, **694**
    - *morsus muris* and *recurrentis*, Presence of, in New Caledonia, **80**
    - *noguchii*, 79
    - *obermeieri*
      - Cultivation of, Methods of, Comparative Study of, **693**
      - Cultures of, Pathogenicity of, **84**
  - Spirillaceae
    - *T. pallidum* and other, Staining of, **700**
- Sputum, Bloody, and, **697** *bis*
- Symptoms, Nervous, Late, **688**
- Syphilis and, **693**

**Relapsing Fever**—*cont.*
- Title of Unnoticed Paper, 701
- Transmission by
  - Bedbugs, **685**
  - Lice, 79, 687
  - Ticks, 80 *bis*, 687
  - Ticks and Lice, **77**
- Treatment by Bismuth, Ulcero-Membranous Stomatitis after, **236**

**REPORTS**, *see also* **LABORATORY REPORTS**
- Argentina : Scientific Mission to, 58
- Egypt, Ministry of the Interior : Dept. of Public Health
  - Memorial Ophthalmic Hosp., Giza (1926), 1020
  - Ophthalmic Section (1923), 1020
- Federated Malay States, Malaria Bureau (1925), 723
- India
  - Bihar and Orissa, Manbhum District, on Leprosy Work, 905
  - Calcutta, School of Trop. Med. and Carmichael Hosp. for Trop. Diseases (1926), Also Brief History of the School, and Rept. for 1920–25, 837
  - Madras, Ophthalmic Hosp. (1926), 1019
- Khartoum, Kitchener School of Medicine (1924–5), 54
- League of Nations Internat. Committee, on Sleeping Sickness, 945
- Ruanda-Urundi Medical Service (1924), 55
- Siam : Petchaburi ; American Mission Hospital (1925–6), 59
- South Africa : Bacteriological Research Work on Plague in (1925) 37
- Uganda Protectorate
  - Mulago Eye Clinic (1925), 482
  - On Blackwater Fever (1925), 653
  - On Fishing Permits on Lake Victoria, since Middle of 1922, 953
  - On Sleeping Sickness (1925), 561–2
- United Fruit Co. : Med. Dept. on Amoebiasis in Colombia, 1, 2, 4, 5
  - On Treatment of *Balantidium coli*, 30

**REVIEWS AND NOTICES**, 74–6, 160, 248–50, 324–8, 411–18, 497–506, 596, 681–4, 771–4, 857–9, 941–5, 1022–25
- Aids to Tropical Medicine (Brooke), 859
- Annales de la Facultad de Medicina, Lima, 681
- Beriberi. A Clinical Study of Nutrition and Disease in the Dutch East Indies (De Langen), 944–5
- Cestodes, The, of Mammals (Meggitt), 249
- Chemotherapie der Infektious-Krankheiten (Schlossberger), 1022–3
- Collected Papers on Tropical Diseases (McDonald), 771
- Compte-Rendu du Premier Congrès International du Paludisme, Rome, Oct. 1925, 771

**Reviews, &c.**—*cont.*
  Critical Review, A, of the Data Recorded regarding the Transmission of Malaria by the Different Species of Anopheles: with Notes on Distribution, Habits and Breeding-places (Covell), 942–3
  Estudios sobre Paludismo y Hematologia en el Norte Argentino (Mühlens, Petrochi, & Zucearini), 682
  Études et Notes d'Entomologie Médicale sur le Katange (Elevage, Tsé-Tsé, Tiques et Moustiques) (Schwetz), 501
  Exposicâo de motivos sobre o problema da prophylaxia da lepra no estado de São Paulo (Souza), 596
  Gifttiere und ihre Giftigkeit (Pawlowsky), 327–8
  Hämatologisches Praktikum für Studierende und Aerzte (Ziemann), 248
  Illustrated Key, An, to the Identification of the Anopheline Larvae of India, Ceylon & Malaya . . . (Strickland & Choudhury, Foreword by Ross), 772
  Imhotep, Vizier and Physician of King Zoser and afterwards the Egyptian God of Medicine (Hurry), 497–9
  Intoxications par les Champignons (Langeron), 75
  John Lydekker. The Memorial at Lloyd's (Dawson), 684
  Journal of the Burma Research Society, 1925. Vol. 15. Part III, and 1926, Dec. Vol. 16., Part III., 499
  Key-Catalogue of Worms Reported for Man (Stiles & Hassall), 249
  Lazaropolis do Prata. A primiera colonia agricola de leprosos. Brazil (Araujo), 681
  Leprosy in India (Cochrane), 943–4
  Life and Work of Sir Patrick Manson (Manson-Bahr & Alcock), 414–18
  Lister Centenary at the Wellcome Historical Medical Museum. Handbook 1927, 684
  Maladies chirurgicales et oculaires aux Colonies. Service de Santé des Expéditions Coloniales, (Rigollet, Motais, Dumas, Le Dentu, Lasnet, & Camail), 160
  Malaria, Die (Seyfarth), 176
  Malarial Psychoses and Neuroses . . . (Anderson), 683–4
  Med. Rept., Hamilton Rice 7th Exped. to the Amazon, in Conjunction with the Dept. of Trop. Med. of Harvard University (Strong, Shattuck, Bequaert, & Wheeler), 324–6

**Reviews, &c.**—*cont.*
  Mosquitoes of the Lower Fraser Valley, B.C., and their Control. (Hearle), 500
  Mycetomas — Osporoses — Sporotrichoses —Blastomycoses (Langeron), 74–5
  Over lymfocytenwaarden en lymfocytaire functies naar aanleiding der tropenlymfocytose (Koumans), 1022
  Paludisme (Marchoux), 326
  Plague Problem, The, in S. Africa . . . (Mitchell, Pirie, & Ingram), 772–4
  Précis of Medicine in the Colonies (Joyeux), 858–9
  Progress of the Science of Nutrition in Japan (Health Organisation of the League of Nations), 857
  Prophylaxis of Leprosy in the State of S. Paulo (Souza), 596
  Recent Advances in Haematology (Piney), 774
  Researches in Polynesia and Melanesia . . . Part I–IV. Relating Principally to Medical Entomology (Buxton, with Hopkins), 941–2
  Rockefeller Foundation; International Health Board Report (1926), 1023 *sqq.*
  Storia della Malaria 'nell Agro Romano (Celli), 411
  Synopsis, A, of the Families and Genera of Nematoda (Baylis & Daubney), 249
  Syphilis, Paludisme, Amoebiase. Notes de thérapeutique pratique (Ravaut: pref. by Widal), 497
  System, Das, der Platodaria (Poche), 249
  Ten Years' Experience of Infectious Disease in Man and Animals in S. America (Kraus), 505–6
  Treatise, A, on Pneumonic Plague (Wu Lien-Teh), 502–3
  Tropical Surgery and Tropical Pathology (Chatterji: Foreword by Sir H. Charles), 503–5
  Vade-mecum de Parasitologie (Loiselet), 327
  Wellcome Historical Medical Museum Handbooks, 684

**Rocky Mountain Fever**
  Transmission by Ticks, 246

**SCURVY,** 129
  Experimental, Metabolism in, **129**
  Incidence, on Da Gama's Ship off East Africa, **330**
  James Lind and, **343**
  Outbreak of, A Cause of, **129**

**SLEEPING SICKNESS,** 560–95, 945–74
  Chemotherapy
    Antimony Compounds, 3 and 5 Valent, Toxicity and Trypanocidal Action of, **962**

**Sleeping Sickness**—*cont.*
Chemotherapy—*cont.*
Chemo-Receptor Theory, **571**
Chemotherapeutic Agents, Action of, in Trypanosome Infection, Interference Phenomena in, 571 *bis*, **965**
Comparison of, in Parafuchsin-fast and Normal Strains, **571**
Parafuchsin, Action of, Inhibiting, on Trypanocidal Arsenicals, **571** *bis*
Salvarsan, Trypaflavin, and Antimony Compounds, Action of, on Spirochaetes and Trypanosomes *in vitro*, Experiments on, **964**
Trypanicidal Action in, of
Bacterial Toxins, **974**
Serum
Influence on, of Malaria Chills, **588**
Work on, of Werner and Hartmann, **589**
Trypanocidal Agents, Arsenicals, **572**
Action on, of Parafuchsin, **571**
A New Group of, **573**
Trypanocidal Drugs, Antagonism of, **571**
Trypanolytic Action of Blood Serum against *T. gambiense*, after Injection of Fourneau 309, **567**
Trypanolytic Sera, Therapeutic Value of, **587**
Tryponarsyl Meurice, Therapeutic Action of, in *T. inopinatum* Infection, **571**
GLOSSINA
Epidemiological Studies on, **946**
Laboratory Experiments on, **945**
Repellant for, **594**
Species Named
*palpalis*
Transmission, Cyclical, by, of Arsenic-fast Strains of Polymorphic Trypanosomes, **947**
Trypanosomes Developing in, Value of Bayer 205, as Prophylactic against, **949**
League of Nations. Health Organisation; International Commission of, on Human Trypanosomiasis,
Activities of, General Review of, **845**
Interim Report of, **845**
Titles of Unnoticed Papers, 974
Trypanocidal Serum Substance in Haemophilia, Investigations on, **588**
TRYPANOSOMES
Animal
Infection by, of Man
Second Case of, **594**
Susceptibility and Resistance to, **575**
Relation to, of Physical Environment of Host, **575**
Posterior-nuclear Form, **952**
Species referred to, by Names
*brucei*
Infection with, Experimental Hypoglycaemia in, **585**

**Sleeping Sickness**—*cont.*
TRYPANOSOMES—*cont.*
Species referred to, by Names—*cont.*
*brucei—cont.*
in Somalia: Morphology: Tendency to Monomorphism; Morphological Comparison: Identification, **575**
*Cruzi* = *Schizotrypanum cruzi*
Cultural Forms of, **967** *ter*
Development of, in *Triatoma megista*, Intracellular Stage in, **966**
Developmental Appearances of, in Insect Transmitter, **966**
Endoglobular Forms of, in Peripheral Blood of White Mouse, **592**
Geographical Distribution of *Triatoma infestans* and the Index of its Infection with, **592**
Paralysis, Experimental, Caused by, Central Nervous System in, Histo-Pathology of, **593**
Reduviid Carriers of, Food Eclecticism in, **974**
in *Triatoma megista*, Costa Rica, 58
*equiperdum*
Infection, Experimental, Number of Trypanosomes and Glycaemic Variations in, Relation between, **584**
Penetration by, of Sound Skin and Mucous Membrane, Possibility of, **972**
*gambiense*
Protective Power against, of Blood Serum after Injection of Fourneau 309, **567**
*gambiense*, and *rhodesiense*, Isolated from Human Cases, Lab. Strains of, Virulence and Morphology of, Variations in, **576**
*inopinatum*, Infection with, Therapeutic Action in, of Tryponarsyl Meurice, **571**
*lewisi*
Infection, Spleen Significance in, in Formation of Inhibiting Reaction Products, **973**
Transmission of, to White Mice, **973**
*lewisi* and *cruzi*, Observations on, **587**
*nabiasi* of Rabbits, Morphology of, and Natural Mode of Transmission, **591**
*somaliense*, Infection of, in Mice Mixed, with Spirochaete Infection, **86, 691**
*vivax*, in Man, **953**
TRYPANOSOMIASES
ANIMAL
Adhesion Phenomenon, A Specific Serological Reaction Occurring in, **968, 970**
in Domesticated Creatures: South Africa: Serological Investigations, **578**

- **Sleeping Sickness**—*cont.*
  - TRYPANOSOMIASES—*cont.*
    - ANIMAL—*cont.*
        - Immunity Questions, Application to, of the Rickenberg Phenomenon, **970**
        - Oedema in, **586, 972**
        - Prophylaxis
          - Dipping in Arsenical Solutions, **564**
          - Moranyl by Mouth, **959**
        - of Rabbits
          - Morphology and Mode of Transmission (by Flea) of Trypanosome of, **591**
        - in Rats, Behaviour in, of Blood Sugar and Liver Glycogen, **971**
        - Superinfection in Non-Sterilizing Immunity, **581, 582**
        - Susceptibility and Resistance to Infections, **573, 575**
        - Treatment by Antimosan, **962**
      - CANINE, 591
        - Keratitis after, 1018
        - Surra in, *see* Surra, *infra*
      - DOURINE
        - Complement Fixation and other Tests in, 578
        - Equine, 578
        - in South Africa, 578
      - NAGANA
        - Bovine, 578
        - Complement Fixation and other Tests in, 578
        - Experimental
          - Action in, of Salvarsan, **570**
          - in Rabbits, Intracutaneous Superinfection Experiments on, with Trypanosomes of the same Species, **579**
        - of Rabbits as Model Infection for Syphilis, 582
      - SURRA
        - Canine: Transmission and Treatment, **591**
      - VULPINE, 159
    - EXPERIMENTAL
      - Blood Sugar during, **970, 971** *bis*
      - Glycaemia in, and Action of Serum-Glucose and Insulin in, **970**
      - in Guinea-pigs
        - Blood in, Pathological Anatomy and Morphology, of, **585**
      - Salivary Glands in, Inflammation of, **973**
    - HUMAN, AFRICAN
      - Chemotherapy of, **674**
      - Diagnosis, Practical, **950**
      - Fishing Permits issued on Lake Victoria since Middle of 1922, Statistical Enquiry into the Records of, **953**
      - Formol-Gel Reaction in, **958**
      - Incidence, Geographical
        - Belgian Congo, 567, 568
        - Budama District and Kavirondo Country, Epidemiological Enquiry into, **949**
        - Cameroon, Northern, **560**
        - French Equatorial Africa, Distribution of, **956, 959,** 962

- **Sleeping Sickness**—*cont.*
  - TRYPANOSMIASES—*cont.*
    - EXPERIMENTAL—*cont.*
      - Incidence, Geographical—*cont.*
        - French West Africa, **594**
        - Gold Coast: Lawra District, **957**
        - Kavirondo Coast: Report on Kleine's Visit to, **946**
        - Ruanda-Urundi, **55**
        - Tanganyika Territory, **954**
          - Ufipa District, **563**
        - Uganda, **561, 953**
      - Pathogenesis of, **594**
      - Prophylaxis
        - Atoxyl: Six Consecutive Injections, **565**
        - Campaign against in French West Africa, **594**
        - Fourneau 309 in, **959**
        - Glossina Repellant, Effective, **594**
        - Immunization Attempts with Dead and Attenuated Trypanosomes, **573**
        - Phenyl Arsenic Derivatives by Mouth, **569**
        - Report on, of the League of Nations International Commission on, **945**
      - Schern's Phenomenon in, **584** *bis*, **585**
      - Treatment by
        - Acetylarsan, **962**
          - Trial of, in Chronic Cases, **569**
        - Antimosan, **569**
        - Atoxyl, Deterioration of the Drug, Detection of, **676**
        - Bayer 205 or Germanin, **960**
          - History of Patients so Treated, **567**
        - Fourneau 270, **565**
        - Fourneau 309, Protective Power of Blood Serum against *T. gambiense* after Injection of, **567**
        - Phenylarsinic Acid Derivatives, **674**
        - Tryparsamide, **568**
          - in Advanced Cases, **961**
      - Trypanolysis *in vivo*, Zone Phenomena in, and the Therapeutic Value of Trypanolytic Sera, **587**
    - HUMAN, AMERICAN=CHAGAS'S DISEASE
      - Experimental
        - Paralysis in: Histo-Pathology of Central Nervous System, **593**
        - Pathological Anatomy of, **593**
    - HUMAN AND ANIMAL
      - Oedema in, **972**
      - Special Discussion on, **958**

- **Smallpox**
  - ALASTRIM, in Costa Rica, 58
  - SMALLPOX
    - Haemorrhagic, Blood Platelet Count in, Significance of, in Prognosis, **829**
    - Incidence
      - Costa Rica, 58
      - Mombasa, 56
      - U.S.A.: Minneapolis, Blood in, **59**
    - Ocular Complications in, **480**

**Smallpox**—*cont.*

- SMALLPOX—*cont.*
  - Prophylaxis
    - Campaign against: Ruanda-Urundi, 55
    - Vaccination, Compulsory, Costa Rica, 58
  - Treatment by Xylol, **61**
  - Varioloid; Ruanda-Urundi, 55

**Sodoku,** *see* **RAT-BITE FEVER**

**SPRUE,** 382–4

- and Addisonian Anaemia, **383**
- Etiology
  - *Monilia psilosis* as Cause of, **382**
- Incidence
  - China, 382
  - Denmark: Non-tropical form, **384**
  - India, 382
    - Bombay, 384
  - Korea, 382
  - Philippine Islands, 382
  - Porto Rico, 382
- Non-Tropical, **384**
- Pernicious Anaemia or, **382**
- and Pernicious Anaemia in Connexion with Deficiency, **382**
- Recurring, **384**
- Treatment by
  - Calcium Lactate and Parathyroid Extract, **384**
  - [Pancreatin], **384**
- Urobilin Output in, **383**

**Tsutsugamushi Disease,** *see* **JAPANESE RIVER FEVER**

**Tuberculosis**

- Incidence
  - Costa Rica, 58
  - Dutch East Indies: Java, **827**
  - India, 52
    - in Natives, **492**
  - Malay States, Deadliness of, 794
- Intestinal Parasitism and, **68**
- Laryngeal, in Javanese, **827**
- and Malaria, Antagonism between, and proposed Malariatherapy, **69**
- Prophylaxis: Sanatoria, Costa Rica, 58
- Treatment by Sanocrysin, for Natives of India, **492**

**TYPHUS FEVER, TROPICAL AND ENDEMIC,** 122–4, 625–6

- ENDEMIC = BRILL'S DISEASE, **123**
  - Incidence
    - U.S.A.: Southern States, Epidemiology: Transmission, **625**
- TROPICAL, **123**
  - Epidemic, Compilation on, **122**
  - Incidence
    - Athens, 430 B.C., 336–7
    - Federated Malay States, **122, 123**
    - Singapore, **625**
    - Tonkin, **625**
    - U.S.A., Along the Rio Grande (1924–5), **71**
  - Sporadic, Weil-Felix Reaction in, **123**
- Typhus-like Fever Following Tick-Bite: U.S.A., **124**

**UNDULANT AND ABORTUS FEVERS,** 108–18, 609–21

- ABORTUS FEVER
  - Causal Organism of, in Cattle and Hogs, Human Infections with, **611**
  - Cause of, and the Origin of Undulant Fever in Man, **110**
  - Incidence
    - U.S.A., **600**
      - Illinois, 609
  - Prophylaxis, 110
  - Public Health Problem in U.S.A., **600**
  - Relation of, to Undulant Fever in Man, **611**
- Titles of Unnoticed Papers, 621
- TULARAEMIA
  - Agglutination, Cross-Agglutination and Agglutinin Absorption in, (*Chart*), **116**
  - Cross Agglutination in, **621**
- UNDULANT FEVER
  - Causal Organism, Isolated in Costa Rica, 58
  - Chemotherapy in, **620**
  - Diagnosis, **108**
  - Due to *Brucella abortus*, Treated with Mercurochrome, **111**
  - Experimental, Anatomy, Pathologic, Post-mortem of, **108**
  - Goats in relation to, 609, 610
    - Immunization of, Attempted, **615**
  - Immunization Experiments, **615**
    - on Goats, **615**
  - Incidence
    - Algeria, **609**
      - Reduction of, **610** *bis*
    - Caucasus, Azerbaidjan, Baku, etc., **108** *quat.*, **109**
    - China, **609**
    - England, **612**
    - Italy; Epidemic, **109**
    - Transcaucasia: Kars, 109
    - Tunis, 610
    - U.S.A.
      - Michigan, **612**
      - New York, **612**
  - Intradermal Reaction with Abortus-Antigen, **619**
  - Laboratory Contagion Cases, **613**
  - in Man, from *Brucella abortus*, **110, 111**
  - Prophylaxis, 610 *bis*
  - Serum Test for, Algerian Sheep Negative to, **610**
    - Spondylitis in, **112**
  - Treatment by
    - Endoprotein of *B. abortus*: Single Injection: Cure, **111**
    - Mercurochrome, **111**
    - Vaccine, **614**
- UNDULANT AND ABORTUS FEVERS
  - Bacteriology
    - *Bact. tularense*, and *Brucella*, Cross Agglutination of, **621**
    - Brucella Strains
      - Agglutination of
        - Non-Specific, **113**
        - in Tularaemia in relation to *melitensis* and *abortus* (*Chart*), **116**

**Undulant, &c., Fevers**—*cont.*
  UNDULANT AND ABORTUS FEVERS—*cont.*
    Bacteriology—*cont.*
      Brucella Strains—*cont.*
        Cause of Contagious Abortion and Origin of Undulant Fever in Man, **110**
        Effect on, of Repeated Action of Immune Sera, **113**
        Infection-Experiments with, on Dogs, **619**
      *abortus*
        Endoprotein of, Cure, by One Injection of, of Undulant Fever, **111**
        in Human Blood, Agglutinins for, **114**
        Infectivity of, to Man, **609**
        Isolation and Cultivation of, **619**
        and *Brucella melitensis*
          Aerobic Cultures of, Magnesium Ammonium Phosphate Crystals in, **620**
          Agglutinability of, Conditions of, **617**
          Agglutination of, Non-Specific Differentiation by, **112, 118**
            Lactic Acid as Means of, **616** *bis*
            Tularaemia in relation to (*Chart*); **116**
          Agglutinins of Thermoresistance of, **617**
          Relations between, **619**
          Serological Differentiation of, **618**
        Strains of, Isolated from Man, Comparison of, with those from Cattle, **117**
      (*Alkaligenes*) *melitensis*, Studies on, **614**
      *melitensis*
        Agglutination of, Mechanism of, **114**
        Carriers of, other than Goats, Search for, **610**
        Experimental Infection with, Ocular Lesions Caused by, **613**
        Isolation of, from Man : China, **609**
        in Man and Beast : Algeria, **610**

**YAWS AND SYPHILIS**, 296-313
  GANGOSA
    Incidence
      China [in Boy], **309**
      Colombia, West Coast of, 57
    in Comoros, 56
  JUXTA-ARTICULAR NODULES
    Histological Examination of Two, **310**
    Incidence
      Equatorial Africa, **313**
      France, 310
      Madagascar, 310
    Structure of, **310**
    Syphilitic, **311**
  SYPHILIS
    Cardiac Affections of, in Ruanda-Urundi, 55

**Yaws and Syphilis**—*cont.*
  SYPHILIS—*cont.*
      of Central Nervous System, Treatment by Malaria Inoculation, **279** *bis*
      Cerebrospinal, Malaria Treatment of, *see under* **MALARIA**
      Diagnosis of, Serum Reactions in, **239**
      Etiology, alleged, according to Portuguese writers of the 16th Century, **331**
    GENERAL PARALYSIS OF THE INSANE
      Immunity in, to Yaws, **304**
      Incidence
        Dutch East Indies, 308
      Prophylaxis, **308**
      *Spirochaeta duttoni* in Brain, during Relapsing Fever Infection, **694**
      Treatment by
        Malaria Inoculation, *see under* **MALARIA**
        Rat-Bite Fever Inoculation, **92**
    Incidence
      Africa : Wide-spread Frequence of, **308**
      Belgian Congo, in Natives, **303**
      Brazil : Ceará, 57
      Colombia : West Coast, 57
      Dutch East Indies, Course of, in Natives, **309**
      Panama, 232
      Ruanda-Urundi, 55
    Influence of, on Leprosy as Indicated by the Wassermann Reaction, **558**
    Miscarriage in Connection with ; Ceará, 57
    Neurosyphilis, Chemotherapy of, **674**
    Prophylaxis
      Anti-Syphilitic Campaign in Central Africa, **308**
    and Relapsing Fever, **693**
    Relation of, to Yaws, **304**
    Severe Bismuth, Poisoning in, Treatment with Sod. Thio-Sulphate, **309**
    Spirochaete of, Generic Name of, **307**
    Syphilitic Hepatitis with Ascites and Malarial Splenomegaly : Brazil, **834**
    Syphiloma, Phagedenic [Algeria], Local Action on, of Stovarsol, **308**
    Syphilomata, Subcutaneous Fibroid, Rare Manifestation of Late, **312**
    TABES
      Treatment by Inoculation Malaria, **278**, **281**
    Treatment
      Book on, **497**
      by Neosalvarsan, 232
    Trypanosome Disease of Rabbits as Model Infection for, **582**
  YAWS
    Chemotherapy of, **674**
    Clinical Modification of, in Patients in Mountainous Districts, **302**

**Yaws and Syphilis**—*cont.*
  Yaws—*cont.*
    Globulin Precipitation in, Independence of, of the Wassermann Reaction, and Behaviour during Course and Treatment of the Disease, **302**
    Immunity in, Investigation of, **297**
    Immunity to, of General Paralytics, **304**
    Incidence
      Age: Childhood, 56
      Geographical
        Assam, 303
        Belgian Congo, in Natives, **303**
        Burma, **303**
        Colombia: West Coast, 56
        Comoros, 56
        Costa Rica (believed) 58
        Philippine Islands, 296 *bis*, 297 *bis*, 300, 302 *bis*
        Ruanda-Urundi, 58
        Samoa, Western, **305**
        Santo Domingo, 306
        Sumatra, 300
    Prophylaxis
      Anti-Yaws Campaign in Samoa, 305
      Control of, Field Experiments in, **296** *bis*
    Relation of, to
      Goundou, **305**
      Syphilis, **304**
    Skin Lesions of, Some Protean Manifestations of, **300**
    Spirochaete of, Staining of, **304**
    Superinfection in, **297**
    Transmission of, Ascribed to an Unknown Fly, by Portuguese Authors, **331**
    Treatment by
      Bismuth, in Isotonic Glucose Solution, and Aqueous Solution of, with Sod. Tart., Comparison of, **307**
      Dermatol, **307**
      N.A.B. Injections, **305**
      Neosalvarsan, in Field Dispensary, Efficacy of, Serological Estimate of, **296**
        Results after Five Years, **306**
      Sod. Bismuth Tartrate: Some Toxic Effects of, **307**

**Yaws and Syphilis**—*cont.*
  Yaws and Syphilis
    Titles of Unnoticed Papers, 313

**YELLOW FEVER,** 101–7, 716–22
  Diagnosis, Post-mortem, Importance in, of the Microscopic Lesions described by Rocha Lima and Hoffmann, **106**
  Disease Picture of, **106**
  Epidemiology of, **722**
  Experimental, Weil's Disease, and Sumatra Infection, Comparative Pathological Anatomy of, **721**
  Incidence
    Africa: West Coast of, **721**
    Benin, Gulf of, **101, 103, 718**
    Brazil
        Epidemic, 17th Century, Portuguese Account of, **331**
      Bahia, 720
      Ceara, 57
    Colombia: Bucamaranga (1923), **104**
    French Sudan, **103** *bis*
      Toukoto, **103** *bis*
    French West Africa, **104**
      Record of Cases seen from July, 1926, to Feb. 1927, **716**
    Gold Coast, 716
      Accra, **718**
    Nigeria, 716
      Lagos, 101, 720
        Analysis of Cases in 1926: Differential Diagnosis, **717**
    San Salvador; Atypical Cases, **105**
    Senegal, 1912, and later, **718** *bis*, 719
  Pfeiffer's Test in, **720** *bis*
  Problem of, at and in
    Ceará, 57
    Far East, **721**
  Prophylaxis, as Advocated for West Africa, **107, 721**
  Titles of Unnoticed Papers, 722
  Treatment by
    Serum, **721**
      Noguchi's, **719**
  and Weil's Disease, **721**

# BUREAU OF HYGIENE AND TROPICAL DISEASES.

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| *Archives des Instituts Pasteur de l'Afrique du Nord (Algiers & Tunis)* | 1921–22 | Vols. | 1–2 |
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| *International Journal of Public Health (Geneva)* | 1920–21 | Vols. | 1–2 |
| *Journal of the London School of Tropical Medicine (London)* | 1911–13 | Vols. | 1–2 |
| *Journal of Tropical Veterinary Science (Calcutta)* | 1906–12 | Vols. | 1–7 |
| *Kala Azar Bulletin (London)* | 1911–12 | Nos. | 1–3 |
| *Medical Science. Abstracts and Reviews (London)* | 1919–25 | Vols. | 1–12 |
| *Paludism (Simla)* | 1910–12 | Nos. | 1–5 |
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| *Reports of the Sleeping Sickness Commission of the Royal Society (London)* | 1903— | No. | 1— |
| *Scientific Memoirs by Officers of the Medical & Sanitary Department of the Government of India (Calcutta)* | 1902–12 | (New Ser.) Nos. | 1–60 |
| *Sleeping Sickness Bulletin (London)* | 1908–12 | Vols. | 1–4 |
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NOTE.—The Director would consider proposals for the exchange of the Bureau publications with other medical and scientific journals in which original papers on hygiene, tropical diseases or parasitology are published.

The following serial publications not received by the Bureau are taken by the London School of Hygiene and Tropical Medicine and are available for reference in the joint library of the School and the Bureau (TROPICAL DISEASES LIBRARY) :—

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